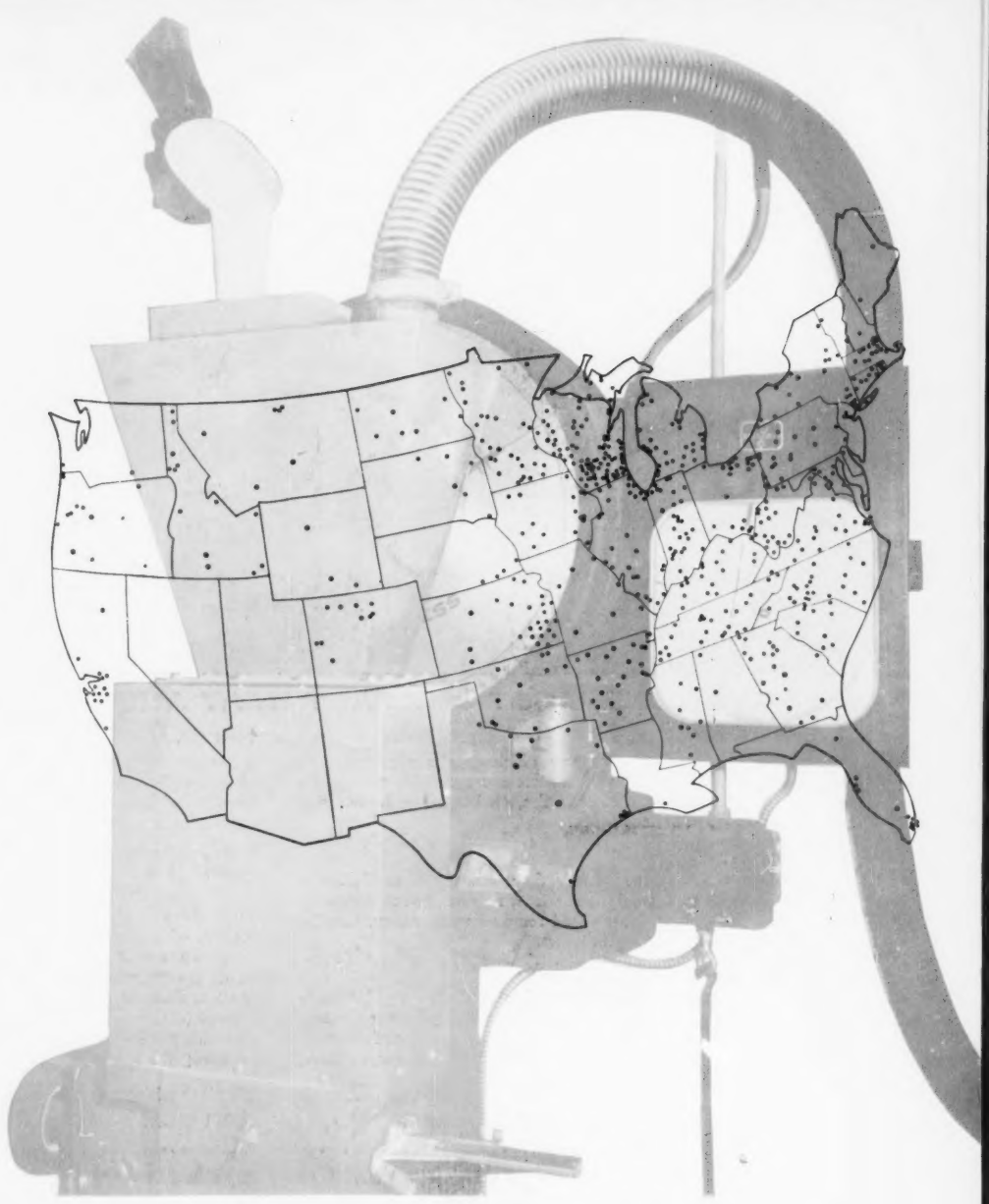
The Magazine of the Registered Professional Engineer

American Engineer

JANUARY 1959



e Engineer at Work:
e Escalator—Its
nb To Success.
Page 26.

• • •

-It-Yourself Pro-
ional Development
Carl A. Roman,
E.

• • •

D Eleven Pages
News Completely
ering the Profes-
!

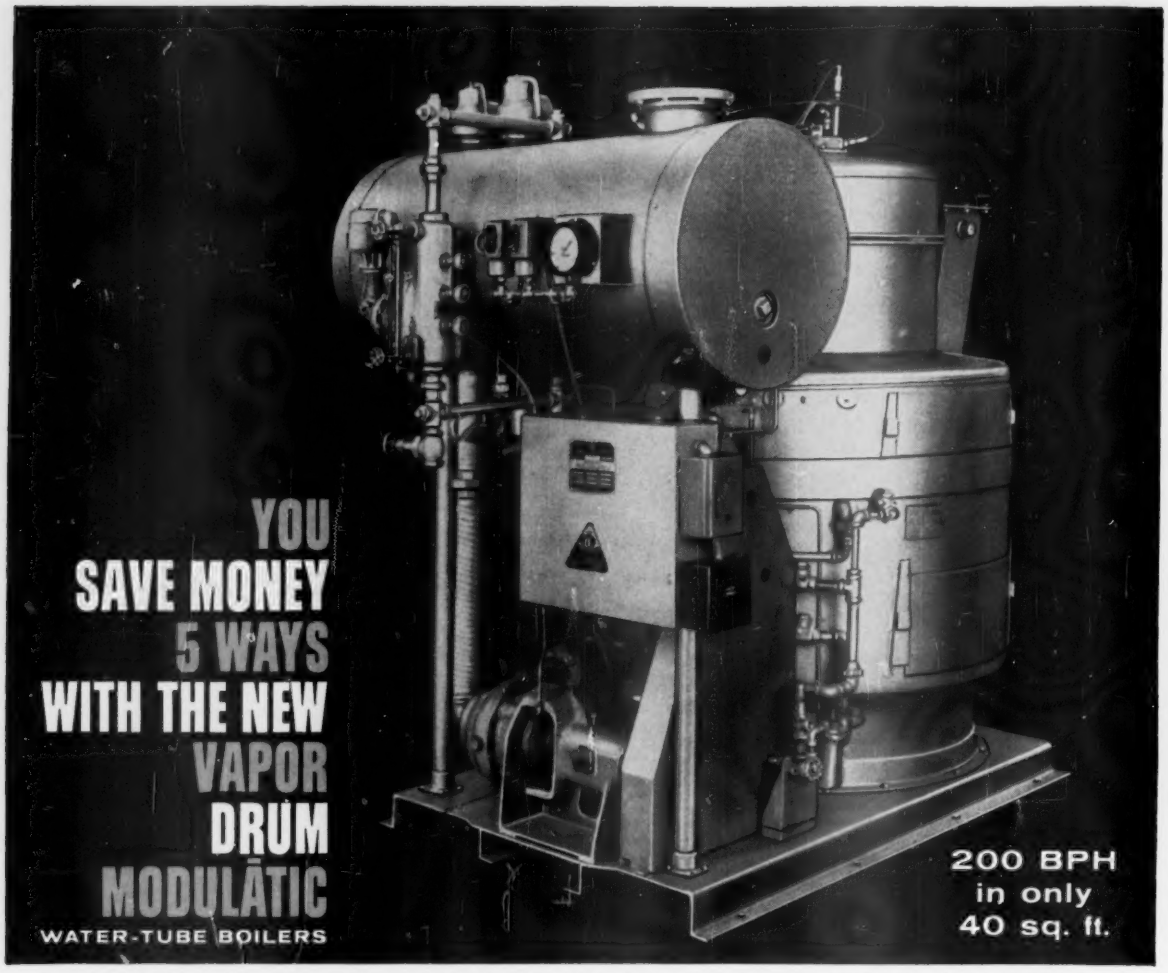
The Health of Millions at Stake:

THE ENGINEER'S ROLE IN FLUORIDATION

By

HAROLD ROMER, P. E., and

EUGENE B POWER
UNIVERSITY MICROFILMS
313 NORTH FIRST ST
ANN ARBOR MICH



"WORLD'S MOST COMPACT HEAT AND POWER PACKAGE"

YOU SAVE
expensive plant space. Compact, efficient; take only one-fourth the space required for other boilers of comparable ratings. Fit anywhere—unused corners, aisles, on balconies; largest size takes only 5′ x 8′ floor space.

YOU SAVE
on installation costs. Delivered completely assembled and wired; need no special foundations, no forced-draft chimney. Fit through plant doors—wall removal unnecessary. Can be installed and operating in hours.

YOU SAVE
on operating economies. Completely automatic—supply "push-button" steam quietly, efficiently, economically. Feature "cotton-soft" 15-second start. Delivers instant hot water, or full steam pressure in 5 minutes from cold start. Burns oil, gas, or both.

YOU SAVE
on maintenance. *Water* tubes are so arranged that they make up multipass *fire* tubes . . . to combine the effectiveness of both types of construction without the disadvantages of either. No impingement stresses—no tube sheets to repair or replace.

Entire unit is covered by 1-year materials and workmanship warranty. 5-year tube warranty includes $50 labor allowance.

YOU SAVE
because of Vapor Drum Modulātic flexibility. Multiple-unit installations meet widely-varying steam or hot-water requirements. Single, coordinating control turns individual units off or on as demand varies—ends the inefficiency of idling larger boilers. (Controls are standard with easily maintained or replaceable parts.) Unit sizes: 20 to 200 hp; 0-15, 5-150 psi steam pressure; 670,000 to 6,690,000 btu/hr; unlimited hot water.

(Heavy duty Modulātics are also available in 9 sizes with pressures to 1000 psi.)

DEFERRED PAYMENT PLANS AVAILABLE IF YOUR CASH HAS OTHER WORK TO DO

VAPOR HEATING CORPORATION
Dept. 39-A,
80 East Jackson Boulevard
Chicago 4, Illinois

Send me free literature: ☐ Drum Modulātic Bulletin 475; ☐ Modulātics for pressures to 1000 psi, Bulletin 586; ☐ Extended Payment Terms Bulletin 486; ☐ Hydrolātic Hot Water Boiler Bulletin 490.

Name_____

Address_____

City, Zone, State_____

(Circle 1 in Readers' Service Dept.)

American Engineer

JANUARY 1959
Vol. 29, No. 1

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
FOUNDED 1934

BPA
Member, Business Publications Audit

AMERICAN ENGINEER STAFF

Kenneth E. Trombley,
Editor

John T. Kane,
Assistant to the Editor

Paul E. Reece,
Staff Writer and
Production Assistant

AMERICAN ENGINEER COMMITTEE

G. Ross Henninger, P.E.
Chairman
H. Carl Bauman, P. E.
Norman S. Bosworth, P. E.
Nelson S. Butera, P. E.
Frank W. Myers, P. E.

Professional News and Features

General News 8
Consulting 10
Education 12
Government 13
Industry 14
Registration 16
Society News 35

The Engineer's Role in Fluoridation 19
By Harold Romer, P. E., Director, Bureau of Sanitary Engineering, New York City Department of Health, and Sylvan C. Martin, P. E., Regional Engineer Director, U. S. Public Health Service

'Do-It-Yourself' Professional Development 28
By Carl A. Roman, P. E., Division Engineer, Pennsylvania Power and Light Company

The Engineer at Work

From Coney to Dallas, the Escalator Has Made Its Way Up 26

Regular Departments

This Month 5
Letters 6
Strictly Business 7
Meetings of Note 11
New Literature 25
From Washington 31
Dates to Remember 36
Thoughts on Professionalism 40
With the Auxiliaries 41
Classified 43
Professional Directory 45, 46, 47, 48, 49
Advertisers' Index 50
Progress in Products 51

ADVERTISING INFORMATION
American Engineer, 2029 K St., N. W., Washington 6, D. C.
Telephone: FEderal 7-2211

NEW YORK:
Austin LeStrange Co., Inc.
420 Lexington Avenue
New York 17, N. Y.
MUrray Hill 5-3277

CHICAGO:
LeStrange Co., Inc.
185 North Wabash Ave.
Chicago 1, Illinois
DEarborn 2-0248

The American Engineer is published monthly by the National Society of Professional Engineers, 2029 K St., N.W., Washington 6, D. C., and printed by the National Publishing Company, Washington, D. C. Second Class Postage Paid at Washington, D. C.

Copyright, 1959, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles.

Subscription Rates: $3 per year in advance to members of NSPE and its Affiliated Societies; $4 per year in advance to non-members in U. S. A. and its possessions, Canada and Mexico. Foreign, $5 per year. Single copy, 50c.

OFFICERS OF THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Clark A. Dunn, P. E., Pres., Oklahoma State University, Stillwater, Okla. • Harold A. Mosher, P. E., Vice Pres., Kodak Park Works, Rochester 4, N. Y. • John B. McGaughy, P. E., Vice Pres., 220 West Freemason Street, Norfolk, Va. • Lindley R. Durkee, P. E. Vice Pres., 448 Federal Office Bldg., Seattle 4, Wash. • L. Eugene Easley, P. E., Vice Pres., 6511 Evanston Ave., Indianapolis, Ind. • W. L. Hindermann, P. E., Vice Pres., 1512 West California Ave., St. Paul 13, Minn. • Noah E. Hull, P. E., Vice Pres., Hughes Gun Company, Post Office Box 2539, Houston, Tex. • Garvin H. Dyer, P. E., Past Pres., Missouri Water Company, 123 West Kansas Street, Independence, Mo. • Russell B. Allen, P. E., Treas., 4610 Hartwick Road, College Park, Md. • Paul H. Robbins, P. E., Ex Dir., 2029 K Street, N. W., Washington 6, D. C.

On the Ohio Turnpike, every mile is

CONCRETE

the paving material with no "moving parts" to cause hidden wear!

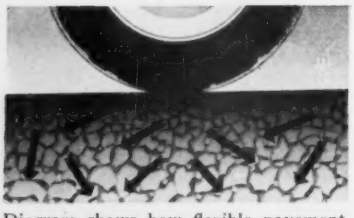


Diagram shows how flexible pavement parts must move. This grinds off corners of aggregate, destroys interlock, causes deep wear. Result: low spots, subgrade overloading, failure.

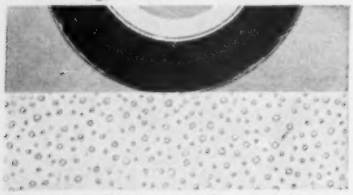


Diagram indicates stability of rigid concrete. There's no internal movement of aggregate and bond. One reason only concrete's load-bearing strength can be computed *mathematically.*

$7,181,898, based on first-cost estimates, was saved by choosing concrete. Now records show maintenance costs are running about *half the original estimates!*

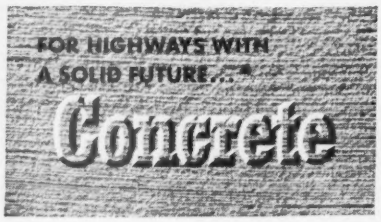
More proof that concrete does the job—and does it for less money. Last year, Ohio's concrete Turnpike handled some 11¼ million vehicles—thousands with loads of 70,000 to 90,000 lbs.—saved money doing it.

There's a reason. Concrete is built to *bear* like a beam, not to *flex*. For flexibility means movement . . . movement creates friction . . . friction brings wear that causes a pavement to wear out *inside* as well as on the surface. That can't ever happen with concrete.

Stability helps give today's concrete its 50-year-plus life expectancy—and its lasting, flat smoothness. On new Interstate System highways, and on all heavy-duty roads, concrete means true economy both now and in the future.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete



(Circle 2 in Readers' Service Dept.)

Water Company, 123 West Kansas Street, Independence, Mo. • Russell B. Allen, P. E., Treas., 4610 Hartwick Road, College Park, Md. • Paul H. Robbins, P. E., Ex Dir., 2029 K Street, N. W., Washington 6, D. C.

"This Month"

"This Month" we feature a "how to—how come" type piece beginning on page 19. Subject: Fluoridation. "How come," because here are two experts in the field tracing for us the rise of fluoridation across the land after years of slow going because of intense opposition. "How to," because we find in the article the methods used by various cities in treating their supplies. As the authors point out, whether you are a civil, a mechanical or in electronics, as an engineer, fluoridation is in many ways your responsibility. But "The Engineer's Role in Fluoridation" is not a lecture: It is real meat on a fascinating subject.

Remember the old jest that an engineer examines the workmanship of the baby carriage before he even notices the cooing occupant? Well, let's plead guilty, we are a bit that way. So, we doubt whether very many engineers have failed to stand on an escalator and wonder how it was invented, who did it, and where. Check "From Coney to Dallas, the Escalator Has Made Its Way Up," page 26, and find out.

We dislike using that overworked term "grass roots" but it's bound to crop up when discussing such an article as " 'Do-It-Yourself' Professional Development" which begins on page 29. Here is an inspiring story of how a group of engineers of the Pennsylvania Society of Professional Engineers devised their own refresher course to encourage registration. These men of the Lehigh Valley worked up their own courses of study, got the State university to cooperate, and now are all ready to go on their third successful year. Others take note!

Now, briefing the news columns:

General. The American Society of Heating and Air Conditioning Engineers and the American Society of Refrigerating Engineers have voted to merge. And, Dr. D. L. Katz has been elected head man of the AIChE.

Consulting. The Canadian Council of Professional Engineers has released schedules of minimum fees and they are printed with the story. Other news: Municipalities and other public agencies are not required by law in Mississippi to advertise for bids on engineering services. And in New York, the results of litigation involving the proper meaning of the term "current prices."

Education. Reports show that Russian women are probably more active in the scientific field than those in other nations. In another story, the National Science Foundation predicts that about 18,000 high school and college teachers of science and math will benefit during the summer of 1959 from Foundation teacher training programs.

Government. The headlines: Student-Trainee Jobs Being Offered by Federal Agencies. Pay of Travel Costs Authorized by Civil Service Commission.

Industry. An excellent story of the long-awaited opinion of the Supreme Court ruling that Federal district courts have jurisdiction to review and set aside NLRB action placing nonprofessional employees in a voting unit with professionals.

Registration. Here the news is that a new mandatory registration bill has been signed in Massachusetts.

And a Happy New Year!

Kenneth E. Trombley

Editor

Letters to the Editor

Educational Policy . . .

Dear Editor:

The enclosed . . . ("Of Long Range Importance," "From Washington," page 21, October AE,) is a sample of the type of reporting that makes me sometimes wonder who's trying to do what to whom!

I readily concede that I am not very familiar with the "scholarships—to be or not to be" question. This report does nothing to explain to me why NSPE opposes scholarships. On the other hand the wording is such as to imply that Mr. Flemming is agitating a program of scholarships that will produce quantity, not quality. Why must this follow? And if NSPE opposes scholarships, why not let us in on the secret? Perhaps this all has been explained in earlier issues, but try to imagine the impact of these paragraphs on a new subscriber or on one who, like me, just forgot.

I have long entertained doubts about the wisdom of blindly supporting and opposing whenever NSPE blows a whistle. Perhaps more explanatory writing in the magazine would convince me the society is ok.

CARL R. WILDER, P.E.
Denver, Colo.

► *Editor's Note:* **Reader Wilder is correct in saying that the item in question did not delve into the reasons for the NSPE position and we would agree that it would be desirable to do this each time the magazine indicates an NSPE position on a particular piece of legislation. The obvious problem, of course, is that of space and there is also some question as to reader reaction to presenting such detail each time a reference is made to a legislative or other position.**

The full testimony explaining the NSPE position appeared in the June, 1958, issue, page 29, and a further commentary appeared in the "From Washington" column of the September issue, page 15.

The AE is in thorough agreement with the premise that individual members should not be expected to blindly support NSPE policy on legislation and other policy matters. We hope that the NSPE policy is always sound and justifiable so as to warrant the support of the members, but we certainly recognize the right and even the duty of the members to indicate their personal views and recommendations.

Henninger Piece . . .

Dear Editor:

The article by G. Ross Henninger (September, 1958) on "The Place of the Engineering Technician" was excellent. I certainly concur with his opinions, and I hope that more space will be devoted to this idea of our professional engineering society promoting the creation of an official class of engineering technicians.

As a consulting engineer, I am well aware of the immediate need for more such technicians; and as a teacher in an engineering school, I can add the argument that there are many students who would be satisfied with a minimum of engineering training and these people would be happy to qualify as engineering technicains.

In answer to some local discussion among our students on unions for engineers, I wrote an article on professionalism. . . . In discussing the well worn comparison between engineering and medicine as a profession, I omitted mentioning the fact that the physicians could never accomplish as much as they do today had they not permitted and lately promoted that technician branch of medicine known as the nurse. . . .

Edward B. Stuart, P.E.
Pittsburgh, Pa.

Registration . . .

Dear Editor:

Surely it is practically impossible to write either an article for the AMERICAN ENGINEER or a letter to you without finding someone who disagrees with one. The article by C. Y. Thomas about engineers in industry in the October, 1958, issue is no exception.

While I agree with most of Mr. Thomas' remarks, I think he was quite inconsistent in bemoaning the fact that industries covered by his questionnaire in Kansas City were not concerned about registration of their engineering employees, and then expressing his pleasure that these same companies do not pay registration fees for their qualified employees.

As an engineer registered in two states at my own expense years ago, and having worked in an industry which appeared to ignore the registration requirements for many years, I had been greatly encouraged when my employer finally implied that registration is desirable by offering to reimburse registration expenses for qualified employees.

Prior to that time, we had wondered whether being registered was a black mark against us, and few engineers had done so. Now our men are registering regularly as they meet the qualifications, and the professional attitude seems much improved. I am *for* reimbursement of registration expenses by industrial employers, not so much for the money involved as for the endorsement and encouragement implied.

WALKER JONES, P.E.
Borger, Tex.

Thanks Authors . . .

Dear Editor:

Kindly thank Professors Albrecht and Orel for their article on the timely topic of technical writing in the July AE.

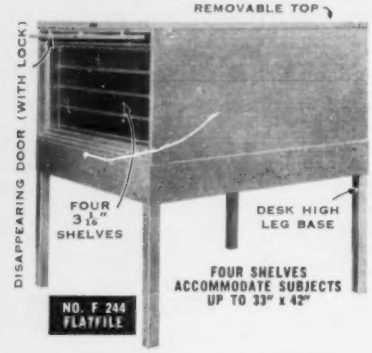
It was very helpful to me.

Perry M. Teepel, P.E.
Jacksonville, Fla.

new Kraftbilt FLATFILE

for filing "can't-fold"

plans...maps...tracings...artwork


REMOVABLE TOP
DISAPPEARING DOOR (WITH LOCK)
FOUR 3½" SHELVES
DESK HIGH LEG BASE
FOUR SHELVES ACCOMMODATE SUBJECTS UP TO 33" x 42"
NO. F 244 FLATFILE

Subjects are filed in removable jumbo jute folders hinged at back. Folders have a metal insertable tab for indexing. Four-shelf sections designed to stack. Desk-high leg base for easy working. Want more information? WRITE:

ROSS-MARTIN COMPANY
PO BOX 800 TULSA 1, OKLAHOMA

(Circle 3 in Readers' Service Dept.)

Strictly Business

Personalities . . . **C. B. Zimmerman** has been named manager of mechanical engineering for **DeWalt Division** of **American Machine & Foundry Company,** Lancaster, Pa. . . . **Dr. F. C. Langenberg** and **G. E. Hutchinson** have been appointed material and process engineers by the **Crucible Steel Company of America,** Pittsburgh, Pa. . . . **Hans H. Sonderegger** has been appointed director of enginering and research of **Gifford-Wood Company,** Hudson, N.Y. . . . **William M. Watkins** has joined the **Hoffman Laboratories Division, Hoffman Electronics Corporation,** Los Angeles, Calif., it has been announced by **Richard A. Maher,** vice president-engineering of the division . . . **Dr. Ruben F. Mettler** has been appointed executive vice president and general manager of the newly-incorporated **Space Technology Laboratories,** Los Angeles, Calif. . . . The appointment of **Thomas J. McNeil** as vice president of **Soiltest, Inc.,** Chicago, Ill., has been announced by **Theodore W. Van Zelst,** president . . . **Stewart & Stevenson Services, Inc.,** Houston, Tex., announces the promotion of **Charles L. Ward** to assistant general manager and **Arthur H. Jones** to executive engineer . . . **Robert J. Kurtz, Jr.** has been assigned as field service engineer for **A. M. Byers Company's** Pittsburgh, Pa., division office.

Mr. Zimmerman

The association of **Jack Wood** as an associate in the firm of **Harland Bartholomew and Associates,** St. Louis, Mo., has been announced . . . **Charles A. Naegei** has been named chief engineer in the Missile Products Division of **Beckman & Whitley, Inc.,** San Carlos, Calif. . . . The appointment of **Karl Gerteis** as manager of Development Engineering Department of the Unitary Equipment Division, **Carrier Corporation,** Syracuse, N.Y., has been announced . . . **Cris Dobbins,** president of the **Ideal Cement Company,** Denver, Colo., has been elected chairman of the board of directors of the **Portland Cement Association** . . . **Gulf Oil Corporation** has announced the appointment of **Walter Shannon** as director of pipe line engineering with headquarters in Pittsburgh, Pa. . . . **David B. Roberts, Jr.,** has been appointed general manager of the Industrial Division of **Sargent-Webster-Crenshaw & Folly,** upstate New York architect-engineers . . . **Robert Adams** has been named manager of Eastern operations for **Packard-Bell Electronics Corporation** with headquarters in Washington, D. C. . . .

Mr. Gerteis

Raymond W. Heimsoth, formerly vice president and chief engineer, has been elected president of the **Ess Instrument Company,** Bergenfield, N. J. . . . **George C. Elmberger** has been appointed director of industrial engineering at **National Can Corporation,** according to an announcement by **Wesley H. Douglass,** vice president.

Victor M. Morgan has been named plant engineer of the Columbia, Tenn., plant of the Phosphorus Division, **Hooker Chemical Corporation** . . . **Benjamin Gray** has become a general partner in the firm of **De Leuw, Cather & Brill,** New York, N. Y. . . . **Dr. Donald G. Wilson** has been appointed general manager of **Stromberg-Carlson,** San Diego, Calif. **Stromberg-Carlson,** a division of **General Dynamics Corporation,** has also announced the appointments of **Clarence A. Wetherill** as chief engineer and **Roy C. Ritchart** as assistant chief engineer in San Diego . . . **Barge, Waggoner and Sumner, Incorporated,** Nashville, Tenn., announces the association of **Wm. Hunter Owen** as an associate member of the firm . . . **Morton S. Fine,** consulting civil engineer, Hartford, Conn., has announced the promotion of **Joseph Vitkus** as assistant to **Mr. Fine. Stanley R. Geda** has also joined the firm as a landscape architect and site planner . . . **George H. Ayres** has been appointed vice president of the **Haller Testing Laboratories, Inc.,** New York, N. Y. . . . **The Asphalt Institute,** with headquarters at College Park, Md., has elected **D. L. Nielsen** as chairman of the board . . . **Dr. Gerard E. Claussen** has been appointed director of research and welding engineering of **Arcrods Corporation,** Sparrows Point, Md.

Dr. Wilson

NICAD Division of **Gould-National Batteries, Inc.,** Easthampton, Mass., has announced the appointment of **Fayette C. Anderson** to their engineering staff . . . **International Rectifier Corporation** has announced the appointment of **Ed Moor** as rectifier field engineer in the New York area . . . **Blair Painter** has been named applications engineering manager for **BJ Electronics, Borg-Warner Corporation,** Santa Ana, Calif. . . . **Robert B. Mulliken** has joined the Pittsburgh district office of the **Sika Chemical Corporation** as a sales engineer . . . **John D. Williams** has been elected president of **Lipe-Rollway Corporation** and **Rollway Bearing Company, Inc.,** Syracuse, N. Y.

Mr. Painter

Members of Two Engineering Societies Vote for Merger

Members of the two societies have voted for the merger of the American Society of Heating and Air-Conditioning Engineers and the American Society of Refrigerating Engineers. This was announced by ASHAE President E. R. Queer and ASRE President Cecil Boling in a joint statement following completion of balloting at a special meeting of ASHAE in Chicago, Ill., and at the ASRE semi-annual meeting in New Orleans, La.

The consolidated society will be named the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Each society recorded a high total number of ballots with ninety-three per cent of ASHAE and seventy-three per cent of ASRE voting for the merger. The ASHAE ballots totaled 5,712 with 5,307 favoring and 405 opposing the merger. The ASRE members voted 3,516 for and 1,239 against the merger with a total of 4,809 ballots.

According to Queer and Boling a two-third majority of the total vote was required to approve the merger, and this expression by the members of the two societies followed a long period of exploration, explanation, and discussion.

The American Society of Heating and Air-Conditioning Engineers sixty-fifth annual meeting and fourteenth International Heating and Air-Conditioning Exposition will open in Philadelphia, January 26-29. ASHAE registration headquarters will be in the Bellevue Stratford Hotel and the Exposition, under the management of the International Exposition Co., will be in Convention Hall.

Dr. Killian to Speak At AIEE Meeting

Dr. James R. Killian, president of Massachusetts Institute of Technology and chairman of the President's Science Advisory Committee, will address the general session of the five-day, Winter General Meeting of the American Institute of Electrical Engineers February 2, in the Statler Hotel, it has been announced by R. T. Weil, general chairman. L. F. Hickernell, president of AIEE, will preside at the session.

Dr. D. L. Katz, Elected New AIChE President

A 1959 slate of officers, headed by Dr. Donald L. Katz, of the University of Michigan, Ann Arbor, as president was announced at the fifty-first annual meeting of the American Institute of Chemical Engineers.

Mr. McAfee Mr. Katz

Other new officers elected were: Jerry McAfee, vice president of the Gulf Oil Company, Pittsburgh, Pa., named vice president; Dr. J. Henry Rushton, Purdue University, re-elected treasurer, and F. J. Van Antwerpen, Nutley, N. J. re-elected secretary.

'. . . Lawyers cannot contribute anything.'

Austin J. Tobin, executive director of the New York Port authority, who has been struggling with the complex problems of the jet age, may have felt a pang of longing for the good old days when he came across the following 14 year old letter from the late Mayor Fiorello La Guardia:

"Dear (letter was sent to air line presidents): This is the last call on the matter of the runway layout at the new airport.

"Thursday, Feb. 3, 1944, at my office, city hall, at 2:30 p.m., come prepared to make any suggestions or forever hold your peace.

"I have heard some grousing about the present layout which I know is not justified. If you have any cockeyed ideas on tangent runways that have not yet been tried out, keep them for some other time.

"I am willing to hear constructive criticism and to receive helpful suggestions.

"I cannot compete against white tablecloths and soft pencils. Everyone who gets two drinks under his belt is now designing runway layouts on restaurant tables.

"We will have a map here, our consulting engineer will be here, and I expect to have the matter finally, completely and definitely settled.

"You may bring anyone you desire from your engineering, technical and piloting staff.

"Lawyers cannot contribute anything. This is not a legal matter.

Very truly yours,
F. H. La Guardia,
Mayor."

—From *The Milwaukee Journal*

2,000 Expected to Attend ASTM 'Week'

Approximately 1,500 to 2,000 members, committee members, and visitors will meet at the American Society for Testing Materials Committee Week meeting in Pittsburgh at the Penn-Sheraton Hotel, February 2-6. About thirty of the society's main technical committees will hold some 350 meetings of subcommittees and working groups to advance toward completion the year's committee work in anticipation of preparing reports for presentation to the society at the annual meeting at Atlantic City next June.

John C. Warner, president, Carnegie Institute of Technology and Technical Consultant to the U. S. delegation to the Second U. N. International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland, will be the guest of honor and speaker at the Committee Week dinner on Wednesday, February 4.

On Tuesday, February 3, a special luncheon is being planned to feature one of Pittsburgh's outstanding industries. The industry concerned will be announced later.

City Planning Session On ASCE Program

City planning has a position of prominence on the program of the national convention of the American Society of Civil Engineers in Los Angeles, February 9-13.

Five convention sessions are scheduled on city planning, including one devoted to a panel discussion, at which at least sixteen papers will be presented. In four of the sessions, the City Planning Division of the society will co-sponsor the meetings with the Air Transport, Highway and Waterways & Harbors Divisions.

The over-all program, however, is a diversified one, in keeping with society policy of covering as many civil engineering interests as possible. Many of the approximately 130 papers to be presented also will have general public interest.

HALF the world is half asleep! Men who could be making *twice* their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

They're *wasting* the most fruitful years of their business lives . . . throwing away thousands of dollars they may never be able to make up. And, oddly enough, they don't realize—even remotely—the tragic consequences of their failure to forge ahead while time is still on their side.

Engineers and other technically-trained men are particularly prone to "drift with the tide" because their starting salaries are reasonably high and promotions come at regular intervals early in their careers. It isn't until later—too much later in many cases—that they discover there is a definite ceiling on their incomes as technicians.

Send for Your Free Copy of "Forging Ahead in Business"

If you want to discover how to succeed while you are still young—if you want to avoid the heartbreak of failure in later years—send today for *"Forging Ahead in Business"* . . . one of the most practical and realistic booklets ever written on the problems of personal advancement.

Here you will find—not a "pep-talk," not an academic lecture—but cold, hard *facts* on how to improve your position and increase your income. You will be told what the qualifications of an executive are in today's competitive market . . . what you must *know* to make $15,000, $20,000 or more a year . . . what you must *do* to accumulate this knowledge.

"Forging Ahead in Business" was written for mature, ambitious men who seriously want to get down to bed-rock in their thinking about their business future. If you feel it is meant for you, simply fill in and return this coupon. Your complimentary copy will be mailed to you promptly.

ALEXANDER HAMILTON INSTITUTE
Dept. 678, 71 W. 23rd Street, New York 10, N. Y.
In Canada: 57 Bloor St., W., Toronto, Ontario, Canada
Please Mail Me, Without Cost, a Copy of Your 48-Page Book—
"FORGING AHEAD IN BUSINESS"

Name .....
Firm Name .....
Business Address .....
Position .....
Home Address .....

(Circle 4 in Readers' Service Dept.)

Canadian Council Releases Schedules of Minimum Fees

A comparative study of the various schedules of minimum fees for professional engineering services, as recommended by the Provincial Engineering Associations, has been released recently by the Canadian Council of Professional Engineers. In general, the study indicates a reasonable degree of uniformity throughout all Canadian provinces, leading the Canadian Council to conclude that the time may be opportune to consider the adoption of a uniform schedule of minimum fees in all provinces.

Schedules of minimum fees based on daily rates, in particular, indicate almost complete agreement among the ten provinces reported in the study. For example, the minimum daily rate for principals is $100; for Senior Engineers, $78; Intermediate Engineers, $54, and Junior Engineers, $36. These fees are based on an average six hour day, except that in Alberta and Newfoundland the fee covers a 7½ hour day. Further, in all provinces, the engineer is reimbursed the actual cost of disbursements for expenses properly incurred in addition to his fees.

Copies of the complete report may be obtained by writing to the Canadian Council of Professional Engineers, 5890 Monkland Avenue, Montreal, Quebec, Canada.

Minimum fees on a percentage basis in seven of the provinces covering complete design, office and field supervision, field testing of materials and machinery as well as revision of drawings to show work as built plus the necessary resident staff are as follows:

Cost of Work	Design & Complete Supervision
Under $100,000.00	10.0%
$100,000.00 to $200,000.00	9.0
$200,000.00 to $1,000,000.00	7.0
$1,000,000.00 to $5,000,000.00	6.0
$5,000,000.00 to $6,000,000.00	5.9
$6,000,000.00 to $7,000,000.00	5.8
$7,000,000.00 to $8,000,000.00	5.7
$8,000,000.00 to $9,000,000.00	5.6
$9,000,000.00 to $10,000,000.00	5.5

Mississippi Opposes Bidding For Services

Municipalities and other public agencies in Mississippi are not required by law to advertise for bids for the furnishing of professional engineering services, that State's Attorney General has recently ruled. The opinion further noted that a contract for professional engineering services is like that for any other professional service, such as an attorney, and consequently competitive bidding for such services is not required.

The opinion was handed down in reply to a request for a clarification of the matter from professional engineers of Mississippi. According to the engineers, governing boards of municipalities seemed to be under the impression that the laws of the State required them to advertise for bids for engineers' professional services. The engineers disagreed with this interpretation, and in addition cited established policies of NSPE and the Mississippi Society which oppose competitive bidding for engineering services.

New York Court Rules Against Engineers

Litigation involving the proper meaning of the term "current prices" in a contract for engineering services on certain sections of the New York Thruway System has been decided adversely to the engineer's interests recently by the New York Court of Claims. The dispute arose in connection with fees for certain design work for which the engineer was to be paid "3½% of the estimated construction cost at current prices, of the project as approved by the Superintendent."

The engineer contended that the State refused to permit him to use prices in the preparation of the cost estimates (which would be the basis for computing his fee) which he proposed to compile in the exercise of his judgment, limited only by what he determined were "market" or "going" or "realistic" prices. The State, on the other hand, ordered the engineer to use as "current prices" those which the Department of Public Works had compiled and published on a statewide and district-wide basis, from the bids of successful bidders for State construction contracts.

Evidence at the trial disclosed that the engineer had reason to know the State would supply price lists and that the prices furnished him would be the latest. In fact, when the engineer executed the contract, the court declared, he was fully conversant with the intention of the provision in question which was subsequently followed by directions in writing consistent therewith.

The court pointed out that any oral agreement referring to a different method of computing fees other than that set forth in the contract was invalid, unless it was reduced to writing and added to the written contract, which would, the court continued, have been a simple matter. Otherwise, "the claimant [engineer] having signed the contract is now conclusively presumed to have known its contents and to have assented thereto." *(Edwards v. State)*

Report From Germany Shows 1,850 Active Consultants

Germany has 1,850 active consulting engineers, of which 650 belong to the International Federation of Consulting Engineers, through their German federation, the VBI of Essen, founded in 1903. It stands for Verein Beratender Ingenieure, or the Professional Association of Self-Employed Independent Engineers.

There is also the 400-member DSBI, Deutsche Societaet Beratender Ingenieure GmbH of Cologne. The DSBI statutes require the members to provide their combined staff and facilities for DSBI-contracted work, if the board so desires. Thus the DSBI can handle singly a project requiring the work of four-hundred engineering firms. This distinguishes them from the VBI which has no such provision.

The VBI is an exclusive nonprofit organization with strict membership qualifications. To be admitted as a member, the applicant must have a diploma from a state technical school or a state-recognized academy, and seven years of professional engineering practice, including one year of independent consulting practice. A VBI member must not be in civil service or in the employ of any firm, even temporary or part time. He may not receive discounts, rebates, revenue from any capital interest in any firm or from licenses and patents, nor may his employees do so. He is personally liable for losses and damages in investments based on his consultation.

Members are obliged to use both the title "Consulting Engineer, VBI" and the federation stamp, and to pay dues to the Federation ranging from $25 for each member with not over two employees, to $75 for those with over ten employees. Honorary members have the same obligations but pay no dues. There are also associate members, who pay half-rate dues; they are former regular VBI members who are no longer independent. They are not allowed to use the title nor the Federation stamp.

A German engineer is allowed by the State to charge a foreign client any fee for work ordered abroad to be done abroad, but in Germany fees are strictly regulated. Sometimes the VBI engineer bills his client at a flat hourly rate (his personal time might not exceed $3 per hour, plus expenses). Hourly pay for employees of VBI members as invoiced in fees makes no distinction between chief draftsmen, scale modeler, or finishing draftsman—they all go under the heading of "qualified employees" with an hourly pay of not more than $2.25 per hour, plus expenses. Work is usually billed on a straight time basis for technical appraisals, consultation and purchase of rights and patents, help in securing official approval of new construction materials and techniques, safety tests of electrical installations and, also, wherever the project value is smaller than those listed in the official regulations, for percentage fees.

German rates for engineers' fees are fixed by law, like those of German lawyers; they are set down in fifty-two pages of detailed classification. There are six principal groups: construction, city building, acoustics, machinery and electrical equipment, technical management consultation, and shipbuilding. In each group, fees based on percentage of project cost are divided into three classes representing degrees of difficulty. For instance, for a $250,000 project in the machinery and electrical equipment section, the work classed as the "least difficult" is at 3.5 per cent; class 2 (more difficult) is at 5.1 per cent; and class 3 (most difficult) is 6.5 per cent of the object value. In construction, the fees are either 8, 12, or 16 per cent, according to the rated difficulty, for a $2,500 project. Their percentage dwindles progressively on higher valued projects. The same services are paid either 2, 2.3, or 2.6 per cent, according to difficulty, for a high cost project of over $10 million. There are also six classifications of types of work, beginning with preliminary drafts and cost appraisal and ending with supervision of construction work. For each of these six kinds of work the engineer may receive a fee ranging from 5 to 45 per cent of the percentage fee listed above. In addition, there are ten special services carrying fees from 5 to 30 per cent of the group percentage fee.

Organizations outside the VBI are combined in the German association of independent consulting engineering firms of Bonn. None of its member organizations places restrictive requirements on membership as does the VBI. The largest organization outside the VBI is the DSBI of Cologne (Deutsche Societaet Beratender Ingenieure), operating on a base capital of DM 100,000. Its members are not bound to the VBI rates in setting fees. The DSBI has subsidiaries in Beirut, Lebanon, and in Baghdad, Iraq. It includes Germany's largest management consultant firm, consisting of 100 engineers and economists.

AE Meetings of Note

Society of Automotive Engineers—Annual Meeting and Engineering Display, January 12-16, Sheraton-Cadillac Hotel, Detroit, Michigan.

American Mathematical Society—Annual Winter Meeting, January 20-22, University of Pennsylvania, Philadelphia, Pennsylvania.

American Society of Heating and Air-Conditioning Engineers—Annual Meeting, January 25-29, Bellevue-Stratford Hotel and Commercial Museum, Philadelphia, Pennsylvania.

American Society for Engineering Education—Midwinter Meeting, University of Houston, Houston, Texas.

Plant Maintenance and Engineering Show—Annual Show, January 26-29, Public Auditorium, Cleveland, Ohio.

Institute of the Aeronautical Sciences—Annual Meeting, January 26-29, Astor Hotel, New York, New York.

Society of Plastic Engineers—Annual Technical Conference, January 27-30, Hotel Commodore, New York, New York.

American Physical Society—Annual Meeting, January 28-31, New Yorker Hotel, New York, New York.

18,000 Teachers to Benefit From NSF Summer Programs

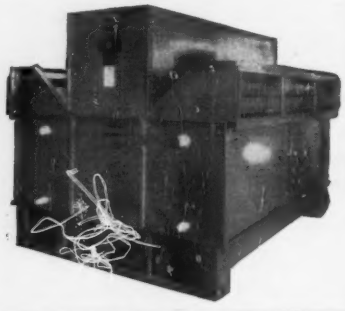
Approximately 18,000 high-school and college teachers of science and mathematics will directly benefit during the summer of 1959 from teacher training programs sponsored by the National Science Foundation at 350 Summer Institutes in 255 educational institutions.

Awards of grants totaling approximately $21,000,000 for the support of the Summer Institutes were announced recently by Alan T. Waterman, director of the Foundation. Institutes will be held in all forth-eight states, Alaska, Hawaii, Puerto Rico, and the District of Columbia.

The success of previous Summer Institutes in meeting the needs of teachers is a major factor contributing to the growth of the program. The first two Summer Institutes supported by the National Science Foundation were held in 1953. The number has grown each summer, reaching 125 in 1958, but the greatest increase, to 350, will be next summer.

Institutes offer courses and activities specifically designed to meet the subject matter needs of science and mathematics teachers who have been out of college for a number of years. They provide opportunity for teachers to learn of recent advances in science and mathematics and to study subjects in which they are inadequately trained.

NIAGARA SECTIONAL *Aero* HEAT EXCHANGER gives close temperature control, saves you LABOR, Power, Water



- **Because the new design improves the heat transfer to the out-door air by evaporation.**
- **Because new features keep your equipment working for long life with "new plant" efficiency . . . always full capacity.**
- **Because you save 95% of cooling water cost.**

You get faster, more accurate cooling of industrial fluids to specify temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin No. 132

NIAGARA BLOWER COMPANY
Dept. AE-1, 405 Lexington Ave., New York 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

(Circle 6 in Readers' Service Dept.)

USSR Women Active In Scientific Field

The remarkable extent to which women participate in scientific education in Russia was described by Dr. Gaylord P. Harnwell, president of the University of Pennsylvania, in an address before the annual Engineering Alumni Society dinner meeting.

In the scientific curricula women are found to a much greater extent in Russia than in America, Dr. Harnwell pointed out.

"An engineering institute I visited last summer," he said "considered that it had fewer women in proportion than most other similar institutes although thirty-five per cent of its students were women. At another institution, in mathematics and physics courses, thirty-five per cent of the students were women. This is ten times greater than the number of women in similar courses in America."

Dr. Carl C. Chambers, vice president for engineering affairs, reviewed the engineering year at the meeting. A highpoint, he said, was the award won by architects of the new Moore School of Electrical Engineering addition recently named by the Philadelphia Chapter of the American Institute of Architects as the best completed building designed by a Philadelphia architect during the past year.

Freshmen Engineering Enrollment Decreases

Although the nation's colleges and universities have reported an increase in enrollment, engineering isn't attracting the freshmen, according to Dr. Raymond Walters, president emeritus of the University of Cincinnati.

Seventy per cent of the 127 American engineering schools reported losses in full-time freshmen, Dr. Walters said, following his thirty-ninth annual survey of campus enrollments.

The survey of 944 accredited schools shows 1,828,660 full-time students enrolled, up 4.1 per cent over last year.

Student-Trainee Jobs Being Offered By Federal Agencies

Several thousand student-trainee employment opportunities will be offered to college students and high-school graduates by Federal agencies during the next twelve months, the Civil Service Commission has announced. Most of the training opportunities will be in engineering and science fields.

The Commission has stepped up efforts to interest students in work-study training programs conducted by Federal agencies and installations, with the expectation that trainees may be attracted to careers in civil service after completing their studies.

The programs provide on-job training for students in Federal research laboratories and offices throughout the country. Although plans vary from agency to agency, there are three basic ways to participate. Students may work during summer vacation and attend school during the regular academic year, may alternate periods of employment and school attendance, or may be employed part-time while attending school.

As a result of the recent ten per cent general pay increase, trainees are paid salaries at the rate of from $3,255 to $3,755 a year, according to the level of scholastic training. They are paid only during periods of employment. For example, a student employed in grade 3 ($3,495 per year) for twelve weeks during the summer would earn about $811.

After completion of work required for a bachelor's degree, trainees may be promoted to full-time professional and technical positions at grade 5; however, those with outstanding collegiate records as well as those with at least six months' student-trainee experience may be appointed at grade 7. Normal entrance salaries for these grades are $4,040 and $4,980 a year, respectively, but for most engineering and science positions entrance salaries at the professional level are higher. In these fields the starting salary for grade 5 is now $4,490, and for grade 7, $5,430.

"Roof, please."

Pay of Travel Costs Authorized by CSC

To aid recruiting, the Civil Service Commission has authorized Federal agencies to pay travel costs to first post of duty for new employees in engineering, natural and mathematical science, architectural, and related positions.

CSC acted under authority of a law passed by the 85th Congress, which permits agencies to pay moving expenses for new employees in certain jobs and the skills involved are critical to the national security effort. Under the law, CSC was authorized to determine positions that meet these conditions.

Payment of travel costs is limited to positions within the continental United States and Alaska. In some cases, payment is also limited geographically to certain regions by CSC regulations. Agencies already have authority to pay new employees' travel costs to first duty stations overseas.

The Commission had proposed the legislation as an important means of enhancing the Government's ability to recruit qualified persons in these categories and put the Government's hiring practices more nearly on par with the practices of progressive private employers.

Study Started to Estimate Manpower

An experimental study aimed at estimating the Government's future manpower needs in four fields—including engineering—has been started by the Civil Service Commission with the cooperation of ten Federal agencies which are the principal employers of workers in these fields.

CSC believes that the study will be helpful in determining the demand that is likely to exist in Federal agencies in certain occupations for future periods up to five years in advance.

Planned with the assistance of an inter-agency committee, the study covers all engineers and engineering technicians, physical scientists, psychologists, and medical officers. Studies of this kind on the future demand for engineers and scientists have been strongly recommended by the President's Committee on Scientists and Engineers, CSC said.

In addition to obtaining information about agencies' anticipated needs, the Commission will gather data from various sources on the future supply of manpower likely to be available in the occupations under study. With data on both demand and supply available, the Commission and Federal agencies will have a means of estimating some of their future manpower problems. This information will be an important aid to determining the direction that Federal recruitment efforts should take in the future.

BOOK MANUSCRIPTS
CONSIDERED
by cooperative publisher who offers authors early publication, higher royalty, national distribution, and beautifully designed books. All subjects welcomed. Write, or send your manuscript directly.
GREENWICH BOOK PUBLISHERS
Attn. Mr. Zeeber 489 Fifth Avenue
New York 17, N. Y.

(Circle 7 in Readers' Service Dept.)

Professional Rights Upheld By Court in Labor Case

In a long-awaited opinion, the United States Supreme Court has ruled that Federal district courts have jurisdiction to review and set aside NLRB action placing nonprofessional employees in a voting unit with professional employees without affording the professionals a separate vote to first determine their wishes regarding inclusion in a mixed unit. A separate vote is afforded professional employees in this regard by Section 9 (b) (1) of the Taft-Hartly Act which provides that "the Board shall not (1) decide that any unit is appropriate for such purposes [representation] if such unit includes both professional employees and employees who are not professional employees unless a majority of such professional employees vote for inclusion in such unit." This clear mandate of the Act was violated by the Board when it placed nine nonprofessional employees in a unit of 233 professional employees on the ground that they "share a close community of employment interest" and the inclusion of the nonprofessionals would not "destroy the predominantly professional character of such a unit."

The Buffalo Section, Westinghouse Engineers Association, ESA, although selected as collective bargaining representative in the ensuing election, filed suit to have the Board's action set aside on the grounds that the Board had exceeded its statutory authority in including the professional employees, without their consent, in a unit with nonprofessionals. In its appeal of an adverse district court ruling, the Board admitted that it had acted in excess of its statutory authority, but claimed only that the district court lacked jurisdiction to review Board determinations in representation matters. Following a decision of the appellate tribunal holding that the district court did have jurisdiction to review Board determinations which violated the express provisions of Section 9 (b) (1), the Board petitioned the Supreme Court for a further review. Because of the importance to the engineering profession of the principle involved, "Friend of the Court" briefs, in support of the engineers' view, were filed by NSPE at each stage of the legal proceedings.

Justice Whittaker, speaking for the 7-2 majority, acknowledged that the Taft-Hartley Act permits court review of Board determinations in representation matters only when they are involved in unfair labor practice charges. But, he asked, "Does the law, apart from the review provisions of the . . . Act, afford a remedy?" To this query, his unequivocal reply was "yes." "This suit," he continued, "is not one to 'review'; in the sense of that term as used in the Act, a decision of the Board made within its jurisdiction. Rather it is one to strike down an order of the Board made in excess of its delegated powers and contrary to a specific prohibition in the Act. Section 9 (b) (1) is clear and mandatory."

The Board's commingling of nonprofessional employees with professional employees without affording the professionals a separate vote was described as "an attempted exercise of power that had been specifically withheld." "It deprived the professional employees of a 'right' assured to them by Congress. Surely, in these circumstances, a Federal District Court has jurisdiction of an original suit to prevent deprivation of a right so given."

Concluding his seven page opinion, Justice Whittaker declared that "This Court cannot lightly infer that Congress does not intend judicial protection of rights it confers against agency action taken in excess of delegated powers. * * * Where, as here, Congress has given a 'right' to the professional employees it must be held that it intended that right to be enforced."

A dissenting opinion, written by Justice Brennan and supported by Justice Frankfurter, contended in essence that the majority opinion would literally open the door to court review of all Board representation determinations, resulting in endless delay and waste of time. This, they said, would frustrate the basic national policy of preventing industrial strife and achieving industrial peace by promoting collective bargaining.

Improvision

Latest miracle of New York City's 34th Street was the Macy airlift which utilized truck-cranes to carry the giant balloons in the annual Thanksgiving parade when the Government forbade the use of helium. Shown is the Macy Toy Soldier, suspended from a Link-Belt Speeder HC-108 owned by Cranes, Inc.

Statistics Announced On Chem Engineers

Chemists and chemical engineers in 1958 are being paid an average of 35 per cent more in starting

salaries than they were in 1952. Chemists' earning power increased about 32 per cent, and that for chemical engineers increased about 37 per cent during this six year period. These are among the major findings in the latest economic survey of the American Chemical Society.

Generally, the gains were not as great in 1958 as they were a year ago. The 1958 median starting salary for inexperienced B.S. chemists was $430 a month compared to $435 in 1957, but M.S. chemical engineers' salaries rose from $525 in 1957 to $541 in 1958. There was relatively little variation by geographic area—for B.S. chemical engineers, West North Central was high with $480 and New England and Pacific were low with $470.

The report summary shows that industry continues to pay recent graduates considerably more than academic institutions, and that chemical engineers do better than chemists.

New Registration Pamphlet Prepared

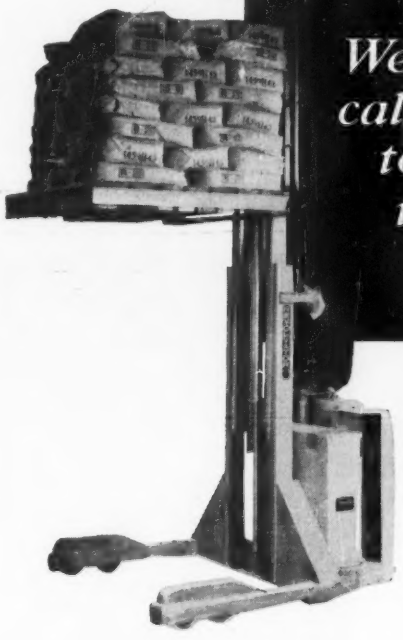
Q & A About Registration for Engineers in Industry, a pocket-sized pamphlet designed to answer the most prevalent questions about engineering registration by engineers in industry, has been prepared by the NSPE Engineer-in-Industry Committee. The fourteen-page pamphlet deals with such typical questions as qualifications, why an examination may be required, whether registration will improve the engineer's economic status, how registration affects promotion, the attitude of management toward registration, and others. This latest NSPE publication is being offered to industry in quantity, without charge, for redistribution to the company's engineering employees. Company executives may obtain a sample copy of the pamphlet upon request to NSPE. With the sample copy will be included a form for quantity order and a covering letter which further explains the purpose of the program and how engineering registration serves industry's interests.

Because this has what it takes...

The rugged durability and extra value (Timken tapered roller bearings in every wheel, spring loaded non-kicking handle, slide planes for easy pallet entry and 360° lifting radius as standard) of the REVOLVATOR Red Giant hand lift pallet truck (above) has built a reputation which means that...

Red Giant Hand Lift pallet truck

We were called on to do this...



Explosion-proof High-lift Go-Getter

One of six basic models . . . REVOLVATOR Series 54.00 Go-Getter for use in explosion hazardous areas for chemical and related companies with Class I Group D or Class II Group G hazards designed at the request of one of the country's leading safety authorities. This electric lift truck meets requirements for both hazards and utilizes screw type housings hydrostatically tested to pressures far beyond those required. Additional safety feature—hydraulically operated disc brake.

Therefore: Whether you need a standard piece of material handling equipment or specially designed equipment, call on

REVOLVATOR CO.

8782 TONNELE AVENUE, NORTH BERGEN, N. J.

(Circle 8 in Readers' Service Dept.)

New Mandatory Registration Bill Signed in Massachusetts

- Efforts of MSPE Finally Rewarded
- Last State to Have Mandatory Law

Persistent efforts of the Massachusetts Society of Professional Engineers were finally rewarded when Governor Foster Furcolo officially signed into law in September a bill providing for the mandatory registration of professional engineers and land surveyors in the State. Until this law was approved, Massachusetts had been the only State in the nation without a mandatory registration requirement.

Massachusetts has had a voluntary registration law on the books for several years, but it did not require registration as a prerequisite to the practice of professional engineering or the use of the term "professional engineer." It merely prohibited an unlicensed person from holding himself out as a "registered" professional engineer, and from using as his own the seal or certificate of a registered engineer.

The new law, however, specifically requires those practicing professional engineering in Massachusetts to become registered, and when a certificate of registration is issued to an individual, it will authorize the practice of professional engineering, rather than merely the use of the title of registered professional engineer.

Among those exempted from mandatory registration are engineers employed by corporations engaged in manufacturing, research, or development operations whose work directly relates to the products of their company. Also, under the new law, engineers-in-training are recognized, and provision is made for these individuals to become certified as such.

The law's "grandfather" clause, which is effective until June 1, 1959, provides that any engineer who resided in Massachusetts for at least one year prior to the date of his application and who was practicing engineering on June 1, 1958, may become registered without an examination. While land surveyors, to become registered under the "grandfather" clause, need only prove that they have been engaged in land surveying, engineers must, in addition, have performed work of a character satisfactory to the board.

The requirements for registration in general follow those of the Model Law with regard to education, experience and examinations: a bachelor's degree in engineering plus four years of experience, or eight years of experience plus the successful passing of an examination, or twelve years of experience provided the applicant is not less than thirty-five years of age. As to form of practice, the new law provides that corporations may engage in the practice of engineering "provided that the person or persons in responsible charge of the activities of the * * * corporation, which constitute the practice, are professional engineers * * * holding certificates of registration."

The new law will have no effect on the registration of individuals already registered under the old law. Copies of the law, known as Chapter 584 of the Acts of 1958, may be obtained from Room 427 of the State House in Boston.

Registration Bill Signed

Massachusetts becomes the last remaining state to make registration of engineers and land surveyors mandatory with the above signing of Engineering Bill H3185 by the Massachusetts governor. Shown, l.-r., are: Massachusetts State Senator Philip A. Graham, sponsor of the Bill; Frank L. Heaney, chairman of the Committee for Registration of Professional Engineers and Land Surveyors; Walter J. Kreske, vice chairman of the same Committee and NSPE national director; Governor Foster Furcolo; Philip E. Fagone, representing engineers in the Massachusetts Department of Public Works, and William L. Hyland, president of the Boston Society of Civil Engineers.

Constitutionality of Utah Registration Act Upheld

The Utah Supreme Court, in a case challenging the constitutionality of the State's 1955 Engineering Registration Act, has cited the absence of professional engineering society membership and activity as one among several important items of evidence tending to support the registration board's determination that an applicant had not attained the distinction in the engineering field requisite for registration without examination. The court also upheld the board's position that the applicant was not entitled to registration without examination under the Act's "grandfather" clause.

The case arose when the engineer applicant sought district court review of the Utah board's refusal to register him without examination on the ground that he did not qualify for registration under the Act's eminence clause. In the district court proceedings, the engineer also alleged that he was entitled to registration under the section of the statute which allows registration without examination of persons actively engaged in the practice of engineering in fields which theretofore had not been required to register. Agreeing with the engineer, the district court ruled that the board's action was arbitrary and that he was therefore entitled to be registered under both the eminence and "grandfather" clauses.

On appeal, however, the State Supreme Court rescinded the district court's order and reinstated the board's conclusion. As to the plaintiff's contention that he was entitled to registration under the Act's "grandfather" clause, the court noted that the mechanical, electrical and civil fields of engineering were expressly excluded from the 1955 Act's "grandfather" clause inasmuch as they had been required to be registered since 1935 and had been granted such "grandfather" rights by that Act. The 1955 Act merely broadened the field beyond these three main classes and required registration of any branch of engineering which "affects the safety of life, health or property, or the public welfare." Plaintiff, as a civil engineer, argued that this provision was discriminatory and therefore unconstitutional. The court held this argument to be untenable, however, "because these three basic engineering fields had previously been required to be registered and licensed, and had been accorded the 'grandfather' privilege in connection with initial registration. The broadened classification in the Act of 1955, bringing in the other engineering fields, but followed the same pattern."

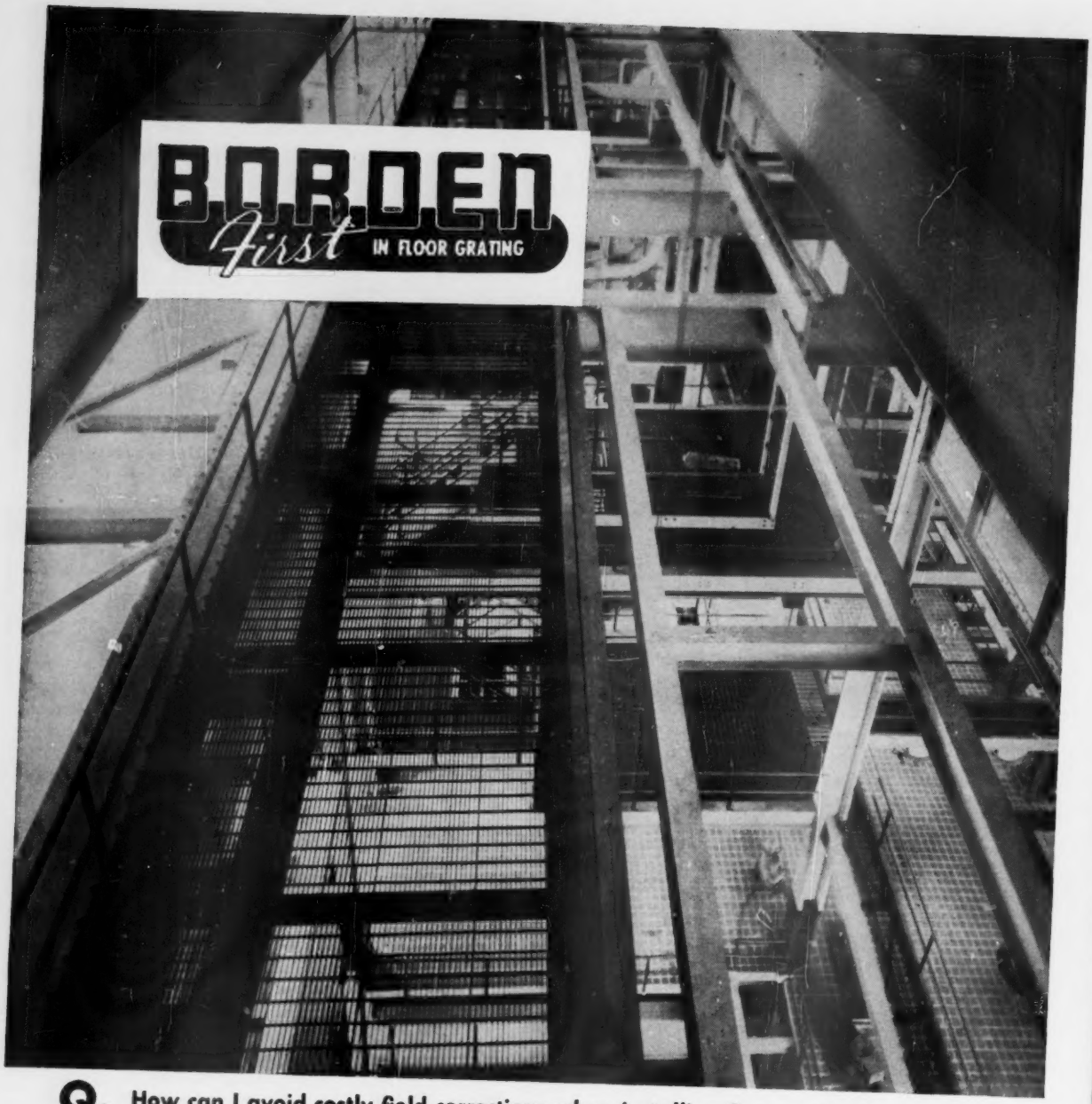
The court noted, as a practical matter, that the plaintiff could not have been lawfully practicing in Utah for four years as a civil engineer without being licensed, for the registration of civil engineers had been required since 1935. "In this regard," the court continued, "plaintiff finds himself in a dilemma: on the one hand he claims to have been in responsible charge of important engineering work; on the other, he asserts that he has not been in violation of the law requiring registration of civil engineers because he was working as a subordinate of a person holding a certificate of registration."

The Act's eminence clause was also challenged by the plaintiff as being unconstitutional in that an unlawful delegation of power was granted to the board to determine the qualification of engineers without specifying the standards upon which the board is to act. The court answered by referring to the case of *Clayton v. Bennett* which tested the same contention in relation to the licensing of architects. The Utah Supreme Court in that case held that the legislature could delegate to a properly qualified and constituted board the determination of standards for such a profession in order to protect the interests of the public.

The plaintiff further alleged as arbitrary the board's announced policy of permitting registration without examination only to engineers who have in some manner attained an outstanding reputation or some distinction in the field. Such policy, the plaintiff claimed, is designed to protect the profession rather than the public, and will have the effect of excluding men, such as himself, who are fully qualified in the practical aspects of the engineering profession.

The court answered this point by considering and analyzing the credentials presented by the plaintiff as a basis for registration without examination. The following facts were found to be pertinent: "Although plaintiff has had some night school courses on the college level, he has never completed high school; does not belong to any professional engineering societies; has made no creative contribution to any engineering committee or society; and has never published anything in the field. * * * Of the eight persons he listed as supporting his application only four are themselves engineers. * * * It is true that all eight of the persons indicated that they felt plaintiff was qualified *to be placed* in responsible charge of engineering work, but there was no affirmative statement by any of them that he had in fact been so engaged for five years as required by the statute."

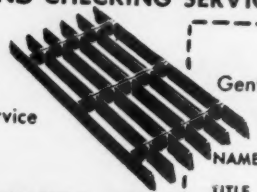
The court acknowledged that by reason of his ability and experience the plaintiff is undoubtedly competent in the engineering activities he has pursued for his employer, "yet, it seems quite clear that there is ample basis in the evidence for the board to regard him as not having attained the distinction in the engineering field requisite to qualify him for registration" under the eminence clause. "Therefore, its action cannot be regarded as capricious or arbitrary." (*Skelton v. Lees*)



Q. How can I avoid costly field corrections when installing floor grating?

A. SPECIFY BORDEN and receive a completely custom fabricated floor grating in cluding cut-outs, toe plates, fasteners and stair nosings. Be sure with BORDEN". FREE PLANNING AND CHECKING SERVICE.

Write for complete information on BORDEN'S free planning and checking service in this FREE booklet



BORDEN METAL PRODUCTS CO.
953 GREEN LANE ELizabeth 2-6410 ELIZABETH, N. J.
Plants at: UNION, N. J.; LEEDS, ALA.; CONROE, TEX.; BEETON, ONT.

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog #AT254.

NAME .....

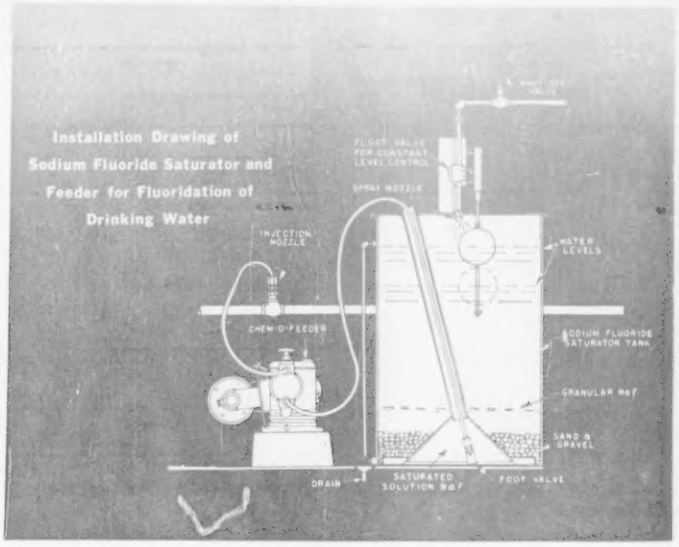
TITLE .....

COMPANY NAME .....

ST. AND NO. .....

CITY AND STATE .....

(Circle 9 in Readers' Service Dept.)



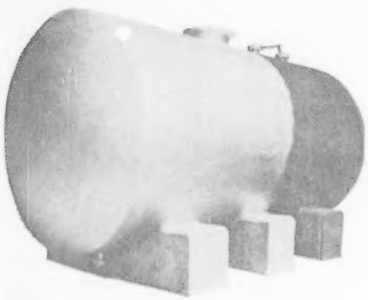
An installation drawing of sodium fluoride saturator and feeder for fluoridation of drinking water.

Editor's Note: **Someone once said that, "One is either all 'for' fluoridation or he is all 'against' it; there is no middle ground." But that was in the early years of what was then a major controversy. Today, although feeling remains strong among some regarding the treatment of drinking water, fluoridation is generally accepted as one safeguard of public health. But in many areas progress lags. What is your responsibility as a professional engineer? In this detailed piece, two experts spell out exactly where we stand today, and what we can attain tomorrow.**

The Engineer's Role in Fluoridation

By
HAROLD ROMER, P. E.,
Director, Bureau of Sanitary Engineering, New York City Department of Health
and
SYLVAN C. MARTIN, P. E.,
Regional Engineer Director, U. S. Public Health Service.

ORGANIZATIONS engaged in public health work, after extensive investigation and experience, have taken a strong, affirmative stand in support of the feasibility, safety and economy of the engineering aspects of fluoridating municipal water supplies. The public, nevertheless, looks to professional engineering societies for guidance on engineering problems.



Baltimore fluoridation installation. Shown is one of the two 6,000 gallon rubber lined tanks used for storing 25% hydrofluosilicic acid.

When any engineering society is approached for guidance, failure on its part to take a stand is often interpreted as opposition.

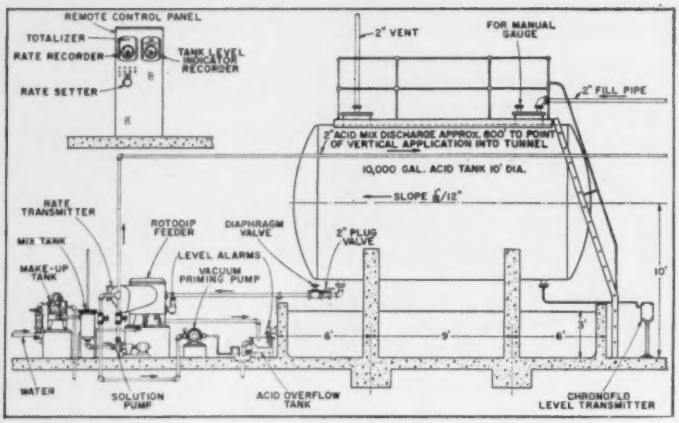
The American Water Works Association, a nation-wide organization of outstanding reputation, has repeatedly reviewed the experience of cities with fluoridation programs, and established that there are no technical problems which competent, well-trained personnel cannot readily solve. Engineers associated with the USPHS, the Conference of State Sanitary Engineers, and many other health agencies also have come to this conclusion.

All professional engineers have an obligation to learn about water fluoridation from reliable sources of readily available data. None of us should hide behind the walls of our particular field of interest. We may be civil engineers who never go near a water processing plant in the normal course of our duties, or electronics engineers who have scant occasion to know that sanitary engineers exist. Nevertheless, as professional engineers we should participate in public discussions after we have done some homework, because our citizenry properly assumes that our judgments have validity on questions involving public works measures.

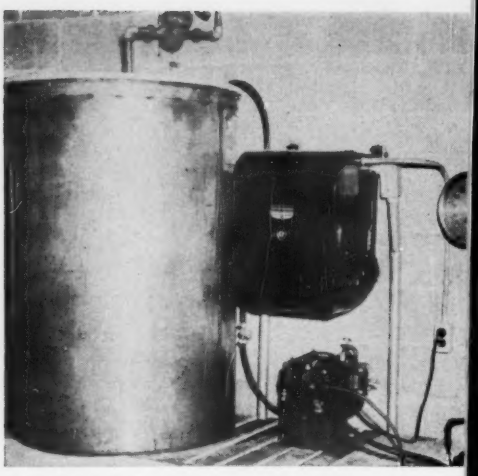
Fluoridation presents us with a responsibility to be informed citizens, because we are professional engineers. Fluoridation also offers us an opportunity to support colleagues in other professions whose competence is of the highest order. As engineers, we can best make our professional judgment bear weight by discussing this subject before our societies and then by taking a public position on the engineering aspects of this important problem.

The Problem

In this country, as in most other countries, tooth decay, almost universally, affects all ages with little regard for race, color or socio-



General arrangement of a hydrofluoric acid feeding system at Chicago, Ill.



A Wallace & Tiernan Solution Feeder at Oregon, Wis.

economic status. The extent of the problem was dramatically brought to the nation's attention by the rejection of almost ten per cent of the first two million selective service candidates in 1941 because of poor dental status.[1] The average person experiences tooth decay in twenty-five to thirty of the fifty-two teeth which he possesses during his lifetime. The average adult of forty has or needs one full or partial denture.

Extensive dental and medical research in the control of dental decay (caries) indicates that a very substantial segment of the population benefits when drinking water contains approximately one part per million of fluoride. Research on water fluoridation points up the following facts:[1]

1. Practically all water supplies naturally contain the fluoride ion in concentrations varying from mere traces to fifteen or more parts of fluoride (F^-) per million parts of water.

2. More than three million persons in the United States live in areas where their drinking water naturally contains 1.0 or more parts per million F^-.

3. Water which contains approximately 1.0 ppm F^-, consumed in early childhood, will prevent about 60-65 per cent of the dental decay which otherwise occurs among those whose drinking water is deficient in fluoride. This protection is carried over into adult life.

4. The effects of consuming water-borne fluorides are noted only in the teeth. No deleterious effects have been detected in other tissues or organs of the body.

Tackling the Problem of Dental Caries

In view of these observations, the next logical step was to design controlled studies to determine whether the benefits observed naturally could be duplicated by raising fluoride-deficient drinking waters to the one ppm fluoride level. Three such studies were initiated in 1946—one in Newburgh, New York; one in Grand Rapids, Michigan, and the third in Brantford, Ontario. Similar studies were also undertaken in Sheboygan, Wisconsin (1946), Evanston, Illinois (1947), and Madison, Wisconsin (1948).

THE studies involved selection of two comparable communities in an area, both with water supplies almost free of fluoride content. The water supply of one of these communities was then fluoridated, the other was not. Data on dental decay prevalence in both areas were obtained by conducting dental examinations prior to the start of fluoridation in the study city. Dental examinations were conducted in both cities before commencing the study and annually thereafter.

In New York State, Newburgh was the study area, Kingston the control community. After ten years of operation, data (Fig. 1), based on clinical and X-ray examination, revealed:

Table 1

Age	Cost of Total Dental Care		Difference in Costs
	Nampa (1.5 ppm F^-)	Coeur d'Alene (zero F^-)	(Savings)
6	$ 9.49	$ 28.58	$ 19.09
7	11.59	37.81	26.22
8	15.75	50.14	34.39
9	15.10	52.61	37.51
10	16.17	50.27	34.10
11	8.94	51.09	42.15
12	10.25	47.19	36.94
13	11.11	65.54	54.43
Total	$98.40	$383.23	$284.83

[1] Ast, D.B., "Water Fluoridation"—N.Y. State Department of Health.

1. 60.3 per cent fewer decayed permanent teeth among Newburgh's 6-10 year-old children compared to Kingston children of the same age.

2. Kingston children had more than twice as many decayed first permanent molars.

3. Among the Newburgh children studies, not even one first permanent molar had been lost. In the Kingston 9-10 year group 6.5 per cent of these teeth had been extracted because of extensive decay.

4. Almost four times as many Newburgh children were completely free of decay in baby teeth. (7.2 per cent in Kingston, 25.8 per cent in Newburgh.)

Other reports indicate that dental benefits similar to those noted in Newburgh have accrued to the children of other study cities. These controlled studies demonstrate that adjusting the fluoride level of community water supplies to approximately one ppm produces dental benefits very comparable to those observed in natural fluoride areas.

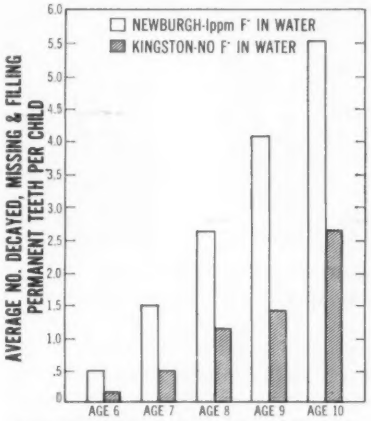
Safety

Water fluoridation could not reasonably be advocated if its dental benefits were derived at the expense of health elsewhere in the body. Extensive studies by physicians, dentists, roentgenologists, toxicologists and epidemiologists concerned with the health of the community has adopted favorable policies on fluoridation. These include: All forty-eight state departments of health, American Medical Association, American Dental Association, American Cancer Association, Conference of State Sanitary Engineers, American Association for Advancement of Science, American Public Health Association, American Water Works Association, U. S. Public Health Service, National Research Council, etc.

On September 4, 1957, the World Health Organziation (U.N.) issued the following press release, "The effectiveness, safety and practicability of fluoridation as a means of preventing dental conclusively demonstrated that persons consuming approximately 1.0 ppm F^- in their water supply showed no increase whatsoever in any illness or disability.

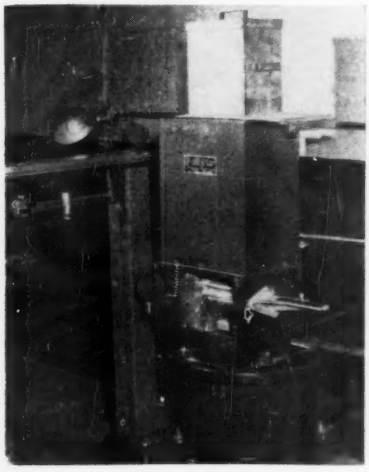
Where the concentration of fluoride in drinking water greatly exceeds 1.5 ppm (such as from certain wells) consumer's teeth may become disfigured by discoloration. However this does not occur when the fluoride concentration is maintained below this level. Maintaining the prescribed concentration of one ppm, it will be seen, has proven no significant problem in a municipal supply.

As a result of these findings, virtually every society and agency



DISEASED, MISSING & FILLED TEETH PER CHILD, AGE 6-10, KINGSTON & NEWBURGH, N.Y., 1953-4

Fig. 1



A Wallace and Tiernan Fluoridator installed at Newburgh, N. Y.

Three hundred and fifty pound drums of sodium silicofluoride are unloaded at the Dalecarlia Water Plant, Washington, D. C.

caries, one of the most prevalent and widespread diseases in the world, is now established."

The Cost of Dental Care

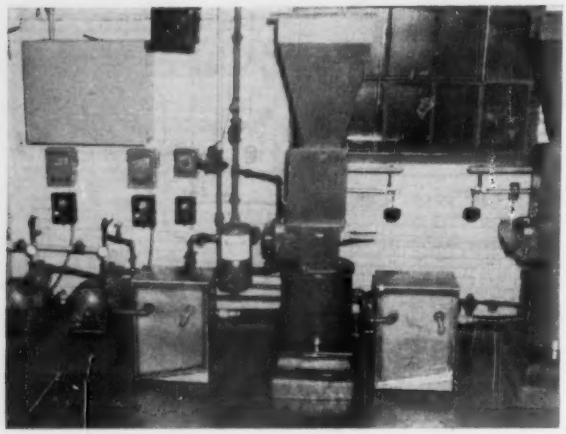
Americans hardly need be reminded about the high cost of dental care for the family. Dental bills often account for the major part of a family's expenditure for health care. In the July, 1956, *Journal* of the American Dental Association[2] a comparison was made of dental costs for children in the towns of Nampa and Coeur d'Alene, Idaho, for the year 1951. The natural fluoride content in Nampa is 1.5 ppm; the Coeur d'Alene supply was free of fluorides. Table 1 shows the comparative costs:

The savings in dental bills per child during the ages of six to thirteen years only was calculated at $284.83. Since this survey was done in 1951, the current savings is estimated at $315 per child. In metropolitan areas, the dental savings is probably equal to at least $345 per child. These figures do not take into consideration any savings incurred past the age of thirteen nor in adult life.

SINCE the Newburgh - Kingston study, many cities and towns have

[2] Young, W.O. and Pelton, W.J., "Planning a Dental Prepayment Program for Children in an Area of Low Caries Prevalence"—J. American Dental Association, July, 1956.

adopted the practice of raising the fluoride content to the anti-caries level. At the present writing, 1,651 communities, consisting of more than 33,500,000 Americans, are consuming water supplemented with fluoride[a]. Among the larger cities employing this practice are Baltimore, Buffalo, Chicago, Cleveland, Indianapolis, Norfolk, Pittsburgh, Providence, St. Paul, San Francisco, and Washington, D. C. It has been estimated that about 110 million people in the country are served by public water supplies. Fig. 2 indicates that nearly one out of every three people in the United States who could drink fluoridated water, currently uses a fluoridated water supply. Thus, seventy-five million citizens served by public water supplies are not receiving the benefits of fluoridation.



Sodium silicofluoride dry feeder (Wallace and Tiernan Volumetric Installation) at Watertown, Wis.

Sodium fluoride solution feeder (Proportioneer Installation) at Janesville, Wis.

Engineering Water Fluoridation

The engineer is advised as to concentration of fluoride desired at the consumer's tap. His job is to introduce the fluoride into the water supply accurately and at low cost. The engineer must now answer the following questions:

1. Which fluoride compound should be used?
2. Where should it be applied?
3. How should it be applied?

There are a considerable number of compounds containing the fluoride ion (F^-) which could be used. At present, however, these compounds are preferred: sodium fluoride, sodium silicofluoride and hydrofluosilicic acid. Other compounds are presently impractical for reasons of cost, corrosiveness, low solubility or unavailability in commercial quantities. The acid is in liquid form whereas the others are sold as solids. Table 2 shows some of the characteristics of these compounds.

Chemical Cost

Of particular interest to any community contemplating fluoridation is the cost of chemicals to be employed. The cost of the commercial chemical represents the cost of the compound. On the other hand it is the concentration of the fluoride ion (F^-) in the chemical which will determine the actual quantity of chemical which will be used and therefore the chemical costs. Based on F^- content, sodium silicofluoride is the least expensive of the three compounds. Sodium fluoride costs 2.2 times as much as silicofluoride; 30 per cent hydrofluosilicic acid costs 1.7 times as much.

The actual cost of any chemical will depend on:

1. The commercial grade purchased.
2. The quantity purchased.
3. Shipping costs.

Solubility

Assuming that one gallon of hydrofluosilicic acid is required to fluoridate a quantity of water, then seventeen gallons of a saturated solution of sodium fluoride, or sixty-five gallons of a saturated solution of sodium silicofluoride, will be required for the same amount of water. This inherent advantage in hydrofluosilicic acid is reflected in the lower cost of solution feeders and solution tanks.

Space Requirements

Housing for feeding equipment and chemical storage can be a significant capital cost item. Particularly in smaller installations available housing may be at a premium.

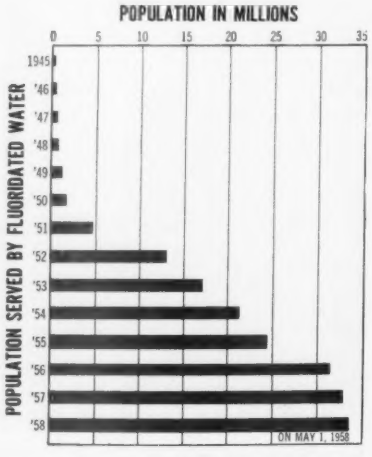
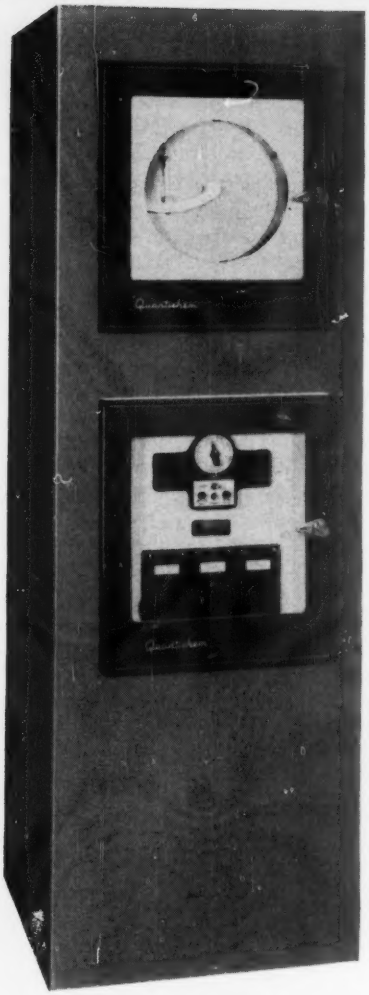


Fig. 2

[a] Data from the files of the U.S. Public Health Service.



Equipment by Milton Roy to automatically analyze and record fluoride concentration in water distribution system on a continuous basis.

Table 2

Fluoridation Compounds[4]
(Commercial Form)

Name	Chemical Formula	Approx. Comp. %	Approx. Cost $/lb.	Avail. F^-. lb./100 lb.	Approx. Cost of Avail. F^-. $/lb.
Hydrofluosilicic acid	H_2SiF_6	30	0.06	23.8	0.25
Sodium fluoride	NaF	95	0.14	42.9	0.33
Sodium silicofluoride	Na_2SiF_6	99	0.09	60.0	0.15

[4] Henry, J.L. and Haskett, James F., "Fundamentals of Applied Fluoridation" —Water and Sewage Works, Vol. 105, R.N. September, 1958, page 233.

For the same quantity of fluoride ion, sodium silicofluoride requires the least storage space; hydrofluosilicic acid the most. Inasmuch as the acid can be stored outdoors in tanks at some distance from the feeder, and no solution make-up equipment is necessary, the use of the acid is advantageous when room is available only for the solution feeder which requires but little space.

Handling and Corrosion

Sodium fluoride and sodium silicofluoride should be handled carefully since the dust of the chemical is toxic when inhaled in excessive quantities. On the other hand, equipment is available to handle the chemicals in a manner which will completely protect employees at the plant. Material of greater toxicity is handled in many industrial establishments with no hazard to employees. Once these substances are in solution, there is no handling problem. Chloride gas, used in World War I as a war gas, is utilized the world over for water and sewage disinfection with safety, despite its lethal qualities when handled improperly.

Practically no problems are involved in using hydrofluosilicic acid since it generally is fed to the proportioning feeder directly from the shipping or storage container without handling.

The acid is corrosive to metallic pipe. Therefore, the acid-feeding equipment and piping is lined with rubber or plastics. When introduced into the water supply system, the acid fluoride has no corrosive effect on pipe line because of the extremely small quantities injected.

Fluoride Feeders

The machanics of feeding fluorides are no more difficult than those for other chemicals employed for many years in water purification. Experience over a period of thirteen years, in both large and small communities, indicates that engineering problems of fluoridating municipal water supplies can be readily handled with safety and in a manner consistent with sound engineering practices. Dosing equipment is well established, dependable and accurate. Devises for feeding fluoride accurately have generally been adapted from those machines originally designed for feeding a variety of chemicals in water treatment and industrial plants. Fluoride feeders, when properly maintained and adjusted, are accurate well within five per cent.

Feeders can be broadly divided into two types: (1) *solution feeders*, where a measured quantity of accurately prepared fluoride solution is delivered during a specified period; and (2) *dry feeders*, where a predetermined quantity of the solid material is delivered during a given time interval. The choice of a feeder depends on the rate at which fluoride is required. This rate, in turn, is determined by the water consumption and the fluoride content of the untreated water. Solution feeders generally are used for smaller supplies and dry feeders for larger ones.

Where a community is supplied with water from several different sources, the use of several small solution feeders is more economical than any attempt to bring the supplies together at a central point for treatment. Multiples of these single units may also be used at a central point. In general, it has been more economical and convenient to use dry feeders when the daily consumption exceeds about two million gallons per day. Solution feeders cost about $250-$350 without auxiliary equipment.

Cost of Fluoridation

The initial capital cost, as well as costs for chemicals, maintenance and operation vary with the size of installation, chemical used and a number of other factors characteristic of a specific installation. The cost varies on the average from five to fourteen cents per capita per year.

Cost of fluoridation is shown in Table 3 from information gathered in 1957.[5]

The average cost of the seven cities is 8.2¢ per capita per year. Where the acid is used, the average cost is 7.8¢; where the silicofluoride is used, the average cost is 8.5¢ per capita per year.

Assuming the cost at 10¢ per capita per year, it would cost an individual $7.00 to use fluoridated water over a life-span of seventy years.

Points of Application of Fluorides

The point or points of application of the fluoride to the water supply is an important consideration. Generally, untreated water supplies present the fewest problems. Inasmuch as these supplies are derived principally from wells, the fluorides are injected into the discharge side of the well pump.[6] The preferred location should be chosen from the point of view of convenience of replenishing the fluoride solutions and ease in measuring the quantity of water treated.

In systems where water is given treatment in addition to chlorination, it frequently is advisable to add the fluoride after the treatment procedure. Coagulation, sedimentation and filtration may reduce the concentration of fluoride in the water thereby necessitating the introduction of additional fluoride.

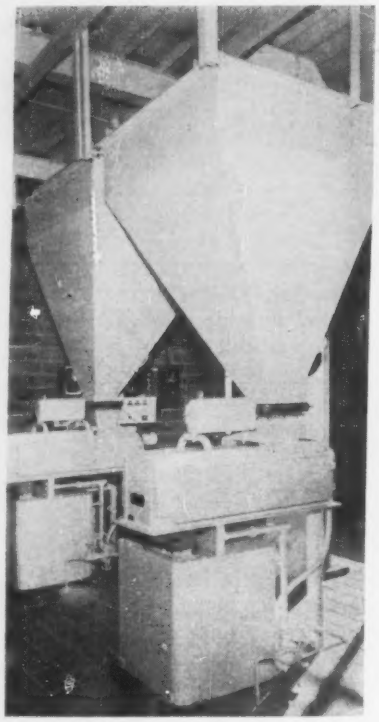
Almost every water supply presents a different problem. The decision as to point of application will be the engineer's since each situation must be individually evaluated.

Controlling Fluoride Concentration

The flow of water in mains varies continually depending basically upon time of day, day of the week, season and atmospheric temperature. In order to provide a concentration of, say, one ppm fluoride in the water supply at all times, it is necessary to vary continuously the rate of chemical application with the rate of flow of water. This is generally simple.

[5] Ingram, W.T., "Water Fluoridation Costs"—New York University, January, 1958.

[6] Maier, F.J., "Engineering Problems in Fluoridation"—American Journal of Public Health, Vol. 42, No. 3, March, 1952.



Wallace and Tiernan Merchen Scale Feeder (Volumetric Weigh Belt Type) located at Scarboro, Ontario, Canada.

Frequently, a venturi meter is employed as the flow measuring and chemical feeder activating device. The principle of operation of the venturi meter is that of a constriction (throat) in the path of flow causing the water velocity to increase. Pressure (in a closed system) is inversely proportional to the velocity; the increase in velocity at the throat causes a drop in pressure at that point; the greater the velocity the greater the pressure drop. This relationship has been employed with great accuracy for chemical feeding for many decades. The varying pressure is utilized to actuate feeders to supply chemicals directly proportional to the rate of water flow.

To check the accuracy of the fluoride feeding procedure and to make certain that the same fluoride concentration is reaching all parts of the distribution system, two controls should be used. One requires periodic fluorde determinations of representative water samples; the other, a determination of the amount of fluoride used and the amount of water treated over a given period. The fluorides in water should be determined at least once a day, and, in the larger plants, several times a day both at the plant and at selected sampling points throughout the distribution system. Equipment is now available to record the concentration of fluoride in the water on a chart on a continuous basis.

Effect of Fluorides on Water Use

Fluorides at the concentration of one ppm impart no taste, odor or color to the water; there is no effect upon the pH or hardness. Survey of brewers, bakeries, bottlers, laundries, drug manufacturing establishments, etc., yielded no evidence of unsatisfactory effects resulting from the use of water containing one ppm F^-. Some ice manufacturers indicated that cracking of blocks increased by fifty per cent with fluoridated water. This problem was easily resolved by adding a minute quantity of ammonium chloride to the water. A 1955 survey[7] of industrial associa-

(Continued on page 33)

[7] Aeryns, A.N., "Effect of Water Fluoridation Upon Industry"—N.Y.C. Department of Health, August, 1955.

Table 3

CITIES	Chemical Used	ANNUAL COST* $ Per Capita per yr.
Chicago	hydrofluosilicic acid	.089
Philadelphia	" "	.083
Cleveland	sodium silicofluoride	.126
Baltimore	hydrofluosilicic acid	.061
San Francisco	sodium silicofluoride	.058
Washington, D. C.	" "	.103
Milwaukee	" "	.052

*All costs including amortization

New Literature

COMPACTORS—The Galion Iron Works & Manufacturing Company has issued a pamphlet covering the various types of compaction equipment in use today, including rollers and vibratory compactors. This well-illustrated, non-technical, 16-page treatise deals with the fundamental problems encountered in the efficient compaction of various materials, and the correct application of the many types of equipment available. It is claimed to be helpful to anyone who has had no previous opportunity to study the subject of soils and materials compaction. An extensive glossary pertinent to the subject is also included.

(Circle 15 in Readers' Service Dept.)

SKULLGARD—Highly resistant to impact and penetration and now available in colors for quick personnel identification are Skullgard hats and caps that are illustrated in a new brochure. Designed to protect against all head hazards, the Type "K" hat and Type "B" cap have applications in construction work, oil fields, mines, pit and quarry operations, chemical plants, steel mills and other industries. The Skullgards, featuring "fixed-crown" suspensions for proper clearance between head and shell, are available in nine colors—red, blue, white, yellow, black, gray, green, orange and brown, the brochure states.

(Circle 16 in Readers' Service Dept.)

DATA FOLDER—Engineers, purchasing agents, and others responsible for the procurement of stainless tubing, welding fittings and flanges will be interested in a technical data folder published by the Tubular Products division of The Babcock & Wilcox Company. This folder contains technical data on analyses, corrosion and oxidation resistance, high and low temperature characteristics, physical and mechanical properties of the family of 18-8 stainless steels. Copies of the data folder, identified as TDC-190, are available without charge.

(Circle 17 in Readers' Service Dept.)

ANCHORS—The new Phillips Drill Company catalog contains a complete listing of all types and sizes of their famous self-drilling Red Head Concrete Anchors. Illustrations show Snap-Off, Rod Hanger, Tie-Wire, Clinch Nail, Stud and Flush Red Heads, de-

scribing the type fastening job to which each is suited and giving the bolt size (from ¼" to ⅞"), as well as the outside diameter, length and depth of thread of each size. Also included in the factual report is a chart showing Red Head pull-out and shear loads in pounds, taken from data obtained through tests conducted by the Pittsburgh Testing Laboratory.

(Circle 18 in Readers' Service Dept.)

KILOWATTS—"More kilowatts per dollar" is the theme and title of a new publication by Aluminum Company of America. The 34-page brochure discusses architectural, mechanical, and electrical uses for aluminum in electrical power generating stations. Between five and six pounds of aluminum per kilowatt of installed capacity is Alcoa's figure for maximum economy in generating stations. The booklet discusses sixty types of applications where the use of aluminum means initial, installed, or service-life savings to the user. Applications discussed are in every case based on specific existing installations. They range from long-accepted switchyard bus conductors, aluminum siding, and ducts, to such newer uses as switchyard structures, die-cast stair treads, and tubes for surface condensers. The booklet discusses applications under the general headings of architectural, electrical, and mechanical, giving a bibliography of available literature for each.

(Circle 19 in Readers' Service Dept.)

COMPRESSOR—A specification sheet describing and illustrating what the manufacturer calls the world's largest portable rotary air compressor is now available. The spec sheet P-114 describes the Le Roi 1200RD2, a 1200 cfm machine. Specifications include those of the compressor, the engine, general specifications, and weights and dimensions. Performance data is also listed.

(Circle 20 in Readers' Service Dept.)

BRAKING SYSTEMS—An engineering bulletin, detailing its new concept in braking systems for industrial trucks, has been published by The Elwell-Parker Electric Company. According to the Company, the new system, known as the Tri-Safe braking system, incorporates the safety and positive control features of three completely independent brakes: a dynamic brake, which serves to quickly slow down the truck using the drive motor as a generator to provide braking action; a power operated hydraulic brake in each drive wheel for normal service braking; and a mechanical brake for emergency stops and parking. According to the free literature, all three brakes are actuated by a single toe bar which extends the entire width of the operator's compartment. The bulletin is highlighted with a schematic drawing of the brake in operation. Photographs of the brake and the means by which it is actuated are also included, as are detailed specifications and operating and design information.

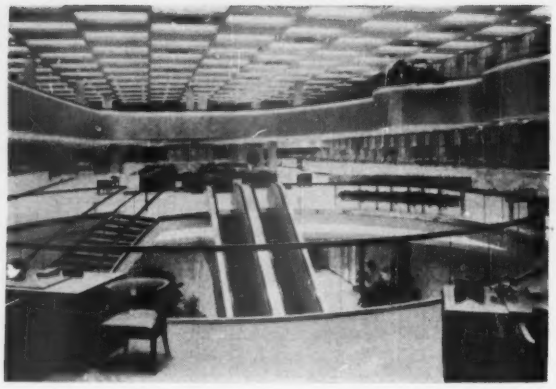
(Circle 21 in Readers' Service Dept.)

MOISTURE METER—A bulletin is now available on the Bouyoucos Soil Moisture Meter. This is of particular interest to agricultural and civil engineers, research groups, scientists, and contractors. The brochure explains what the moisture meter is, how it works, and what it means to the users. The basic purpose of the meter is to indicate rapidly and accurately the amount of moisture available in a given section of soil, whether this information be necessary for agricultural, engineering, or research purposes, the manufacturer states.

(Circle 22 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in this column, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

From Coney to Dallas, the Escalator Has Made Its Way Up



A modern day escalator adds to decor of the beautiful Republic National Bank in Dallas, Tex.

GENERALLY speaking, any discussion of "those ultra-modern buildings" or "that futuristic structure" invariably includes reference to that mass conveyor of ambulating humankind, the escalator.

A little research discloses some very *ancient* facts about this moving symbol of *modern* architecture:

Seven years before the Spanish-American War, a fellow named Jesse W. Reno got a U.S. patent on the forerunner of the escalator (1891) . . . although the name was not coined until another pioneer, Charles D. Seeberger, linked "escalade" and "elevator" in 1900. The word was first used when a prototype was introduced at the 1900 Paris Exposition.

Reno first exhibited his "Inclined Elevator" at the Columbia Iron Works in the summer of 1892, according to mention in *Engineering News* magazine for August 25, 1892. Beyond these facts, little is known—except that Reno's "Continuous Elevator" was again exhibited at the Iron Pier, Coney Island, in 1894, and at the Brooklyn Bridge in the winter of 1894-95.

An inventor named George H. Wheeler was granted an escalator patent in 1897 covering flat cleat steps and comb plates, and various miscellaneous gear, all of which was quite an improvement over the original Reno machine. This, incidentally, is the basic patent on which modern escalators are built.

Wheeler's rights were acquired by Seeberger, who sold out to a gentleman named Norton P. Otis—quite a renowned elevator manufacturer even then—who built the first true "escalator" in 1898.

First permanent installation came about in 1901, when the Manhattan Elevated Railway installed a Reno machine at Third Avenue and 59th Street. (It continued in operation until the "el" was torn down in 1955.)

In 1911, the Otis Elevator Company purchased all Reno patents and continued manufacture of the

same Reno machine until 1922, meanwhile turning out its own escalators."

The original escalator that was introduced at the 1900 Paris Exposition was installed at Gimbel Brothers store in Philadelphia, where it was in operation until 1939. Though its function was phenomenal, its appearance was rather "crude," ponderous.

Otis had been striving, meanwhile, for a more permanently finished, "ripple-free" appearance in escalator sides, rails—a thin, durable, rust-proof functional material. Otis discovered, twenty-five years ago, that engineers at the Haskelite Manufacturing Company of Grand Rapids, Michigan, had found a method to bond various metal facings to plywood surfaces—and the escalator took on its modern appearance. Now known as Plymetl, this metal-covered plywood is a familiar panel in today's make-up of truck vans, railroad pullman interiors, building walls, some aircraft bodies, X-ray tables, buses, counter tops, coolers and even exterior sheathing on Diesel locomotives—as well as elevators and escalators.

The advent of Plymetl gave escalators their present-day dimensional stability and permanent beauty. This metal-clad plywood combines the high-density, surface-hardness, fireproofness and high-strength of metal with the machineability, the good insulating values for heat and sound, moderate cost, light-weight and excellent stiffness factors of plywood. The bulk of the interior paneling is made of porcelain enameled steel bonded to plywood.

In 1948, the world's longest escalator was installed at Tyne Tunnel, near Newcastle, England. It is 170 feet long and has an 85-foot rise.

JUST recently, one of the world's speediest sets of escalators was installed at Belmont Park to give race fans a lift. This pair glides race enthusiasts up and down at the rate of 20,000 an hour.

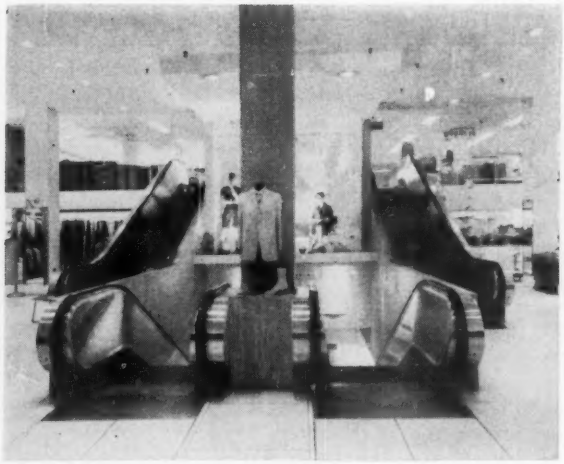
Even more unique, perhaps, is the fact that these escalators are completely exposed to all the elements, and Long Island gets some rough elements, weatherwise. All electrical and mechanical parts of the stainless-steel Plymetl escalators have been especially treated to immunize them to rain or dampness.

Four other Otis escalators installed in the grandstands, as part of the track's $3,000,000 improvement program, are partially exposed to foul weather and each one can carry more than 6,000 fans an hour.

Indoors, of course, the ultra-modern escalator system with its 19th Century lineage is—well, "moving forward, by leaps and bounds," in the figurative sense. There are some 11,000 escalators throughout the world, now—5,600 alone in the United States.

More and more, especially in retail stores, the building planner is realizing that while the elevator "gets people there," the escalator "keeps 'em moving." Unlike the very necessary elevator, whose purpose is purely a high-speed vertical transplanting of knots of people, the escalator transports a heavy and continuous stream of passengers and provides an ever-present stimulus to passer-by and impulse-shopper to circulate, vertically and horizontally, without missing anything. Peaks and lows of traffic are handled instantaneously. The escalator is always ready for the next customer, and it's hard to resist stepping on for the effortless glide.

"Escalator" was a trade name of Otis Elevator Company until World War II; but, increasing use of such phrases as "escalator clauses" made it more and more difficult to protect the name. It belongs to the English language now. —**End.**



The four escalators in Kaufman's Department Store, Pittsburgh, Pa., are striking examples of a parallel continuous arrangement at the street level.

One of the world's speediest sets of escalators gives Belmont Park race fans a lift at a rate of 20,000 an hour. These escalators are exposed to all elements.

A Unique Program . . .

'Do-It-Yourself' Professional Development

By

CARL A. ROMAN, P.E.

Division Engineer, Pennsylvania Power and Light Company

Several years ago a new law in Pennsylvania made it necessary for engineers to pass a written test in order to obtain certificates of registration as P.E.'s. This article relates how a study group was organized in the Lehigh Valley to review material prior to the examination.

THE hurling of Sputnik I into space last year reverberated around the world with an intensity reminiscent of the first atomic bomb explosion in 1945. More significant than the launching of the Space Age, Sputnik I was dramatic evidence of technological competence by a nation that has been considered backward in scientific and industrial progress and whose political ideology is making the world an armed camp. An assessment of this situation to the United States has led to these important conclusions: (1) Technological competence is as much a weapon of survival as guns and ammunition and (2) Our nation's technological worth must be quickly raised to meet this challenge to our world leadership in scientific achievement.

These events have placed the national spotlight directly on the engineering profession, climaxing years of effort by the engineering and technical societies for recognition of the role of the engineer in our national economy. Not that these past years were without results. Industry already has recognized the engineer as a vital part of its organization and is investing heavily in educational and development programs to raise him to the increasing position of importance he holds in business today. Our nation's standard of living, the highest in the world, is a reflection of this new industrial role. But now a greater sense of urgency exists for the growth of a strong and effective engineering profession because of the impending crisis between two political ideologies, one recognizing the freedom and worth of the individual, the other having no regard for either.

The National Society of Professional Engineers provides the recognized framework for the growth and unification of the engineering profession. Ideals of professional dedication and unity must be more aggressively encouraged; and action must be taken to grow in numbers —for in numbers there is strength. But growth is not fostered at the national and state levels only; it can effectively be done by individuals at the grass-roots local levels. Paul H. Robbins, NSPE executive director, in the July, 1958, issue of AMERICAN ENGINEER points this out in his article: "The Importance of Membership" when he says, "The strength of the profession will only be as great as the accumulated interest of the individuals who make up that profession." Toward this end, a rather unique program for developing registered professional electrical engineers is now in its second year in Allentown, Pennsylvania.

Its evolution traces back several years to the passage of a law in the Commonwealth of Pennsylvania making it mandatory for all ap-

plicant engineers to pass a written examination to obtain certificates of registration as professional engineers. At that time engineers of Pennsylvania Power & Light Company organized self-study groups to review the wide range of material required by the State's electrical examination. In addition to the ethics and economics required in all classifications of engineering examinations, the electrical examination ranged broadly through the power, communications, electronics, and illumination fields. Since the practicing engineer is usually proficient in only one of these fields, the attrition rate of these power engineers was about seventy-five per cent as the unfamiliar fields of electronics, illumination and communications created stumbling blocks surmountable only at an extremely high cost in individual time for self-education. Of those that tenaciously completed the work, which was based solely on solving problems taken from various other state examinations made available through the Pennsylvania Society of Professional Engineers, approximately twenty per cent successfully passed the exams. In 1954 this type of study group was abandoned.

In the ensuing three years, the Lehigh Valley Chapter of PSPE succeeded in getting its two area colleges to offer formal preparatory courses for taking the examinations. These were fairly successful in all fields except the electrical engineering field. And in 1957 when no electrical engineering review course was offered, engineers of Western Electric Company and Pennsylvania Power and Light Company launched the first Professional Engineering Study Group of the Lehigh Valley.

FUNDAMENTALLY the course technique strikes a compromise between formal education conducted in the atmosphere of an informal business conference and self-study. It makes maximum use of individual knowledge and talent within the group. This serves the dual purpose of making the course attractive and also making it very economical.

Its development posed the following problems: (1) What should the course content be and how long should it run, (2) What paid instruction would be necessary and how would it be paid for, and (3) How could individual talent be organized for maximum contribution toward group success.

The first meeting was scheduled as an organization conference for the primary purpose of exploring all these problems. In so doing the underlying objective was to assure the group that this would be a program tailor-made to the individual's specific needs. The group consisted of ten PP&L engineers from various sections of the operating and engineering departments; five Western Electric engineers from various departments, and one Westinghouse Electric Company engineer employed as a lighting consultant. The following basic approach arising from this conference was adopted and this is relatively unchanged in the present second offering of the course.

All members enrolled in the class take an active part in its operation. A chairman and secretary-treasurer are chosen and various committees are appointed to handle the affairs of the group.

The course covers a period of fifteen weeks, composed of one night each week of 2½ hours, and embracing all the major fields, with particular emphasis on power and electronics-communications. One night a week allows more time for self-study in the direction most profitable to the individual. Problem solving constitutes ninety per cent of the course and formal lectures, as necessary, make up the remaining ten per cent. Problem sources are the Pennsylvania professional engineering examinations in electrical engineering from 1952 to date, and a compilation of problems from various states published by the Pennsylvania Society of Professional Engineers (PSPE). Several basic handbooks are designated as texts and all problem solutions, regardless of personal texts used, are referenced to these. Assigned problems are discussed in class then duplicated and distributed for everyone's use. These duplicated problems, properly supplemented and cross-referenced to the individual's references, constitute a key reference for the examination.

Financing is done through a "kitty" to which each man contributes $10. Paid instruction seems necessary in the fields of economics, and lighting, and is paid for at the local going rate for instructors. The kitty serves as interesting secondary function of encouraging attendance through a "fine" system that penalizes a man a maximum of 50 cents for lateness and $1 for absence without good reason. The fines are applied toward instruction expenses and the balance of the costs are shared equally by all members of the group. More fun than dollars resulted from this system and the attendance was excellent. Money remaining in each member's account at the end of the course is returned.

The contribution of the individual is the basic ingredient of success in the course. Individual participation by all members of the

group in the organization and planning of the course generates enthusiasm that carries over into its operation. A chairman and secretary-treasurer are selected and a group of committees appointed to cover various phases of the subject material. A finance committee consisting of the secretary-treasurer

Time is saved in the class by projecting the problems on a screen. This is followed by group discussion.

and two others is also appointed to administer the kitty and fine system. Each subject material committee has the responsibility of selecting appropriate problems in that subject, recommending supplemental texts and material (other than the basic reference books), finding answers to difficult problems, submitting a complete list of problems worked by subdivisions of the committee's catagory, overseeing the duplication and distribution of every problem, and assisting the chairman in moderating the meeting on the particular subject.

For problem assignments the group is subdivided into smaller groups of three or four men who work together or have other means of daily contact. Each small group receives a problem assignment of three to six problems, depending on the difficulty of the subject, and has the opportunity of checking their work or cooperating on difficult problems before attending the meeting. This results in many more problems being done and saves considerable discussion time at the meetings.

PROBLEMS are discussed in class by projecting them on a screen—this too is a time saver since it eliminates a great deal of blackboard work. Other reference material also is projected for further clarification of the problems.

Statistical results of last year's course are as follows: nine of the ten, or ninety per cent who took the State examination passed. Of the five who didn't take the test, two were compelled to drop the course due to work transfer, one failed to process his application in time, while only two felt they weren't sufficiently prepared to pass the exam.

A survey of those who took the course last year and are taking it this year (approximately one-third of whom participated in one or more self-study or/and formal preparatory programs) revealed the following general comments:

1. By comparison with other courses, the material was much better covered for the time spent, and for the purpose intended.

2. The exchange of application information in the various industrial fields was broadening as well as educational (five industries plus a teacher from a local school are participating in this second course with diversified experience levels ranging from a superintendent of engineering to a foreman for an electrical contractor).

3. The informal atmosphere of the conference type meetings was more conducive to learning by encouraging more direct participation in "class" work.

4. Self-study, which is still a necessary essential, was stimulated by channeling efforts and thus minimizing total time spent for review.

5. It's the "best buy" (educationally). The cost per man averaged $2.50.

The role of the community as an adjunct to the key part played by the individual in making the program a success deserves recognition. Without the use of stenographic services and supplies of the companies represented, duplication of the problems and solutions would have been extremely difficult. Industrial specialists in many fields assisted by answering questions on difficult problems; and in one case involving the National Electrical Code a PP&L specialist in this field moderated the meeting. PP&L Company's well-equipped conference rooms (including projectors, screens, etc.) were made available in advance and provided ideal meeting places.

The Pennsylvania State University Center in Allentown offered suggestions on texts, reference material, instructors, and were sources of general advice. A professor from Pennsylvania State University moderated the ethics phase last year (this year the executive secretary of the PSPE will be the moderator). Manufacturers, upon request, sent helpful tables and other engineering publications.

The community's contributions were very significant in determining the bargain price of $2.50 per man!

The Lehigh Valley of Pennsylvania, progressive both educationally and industrially, has accepted this approach as a healthy addition to the community's activity in technological development. Though no publicity has been given to the program, inquiries have already been received from people who wish to participate in the next course. The relative simplicity and economy of the technique readily lends itself to general educational programs in industry for small group self-development. With promotion and further refinements, this method can be a most effective instrument to be added to the nation's educational tool kit for stimulation and professional development of the engineer.—End.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

THE PLACE OF ENGINEERING AND SCIENCE IN ATOMIC-SPACE AGE GOVERNMENT

Several recent developments involving major decisions of Federal organizational policy, although ostensibly unrelated, serve to point up a growing dilemma for the experts in organizational charts and lines of jurisdiction. The question they face, put bluntly, is what to do with those "pesky" engineers and scientists who intrude their overriding importance into almost every nook and cranny of the Governmental structure. The point is well illustrated by some recent personnel figures from the Air Force. The agency

◄ Maj. Gen. John Medaris

Donald A. Quarles ► -

has some 8,200 civilian engineers and scientists who make up less than three per cent of the total staff, but a total of 5,640 employees in Grade 13 and above, 2,391 or 42.4 per cent are engineers and scientists. A year earlier there were 5,193 in Grade 13 or above, of whom 2,068, or 39.8 per cent were engineers and scientists. It would be a fairly safe bet that next year will see another increase in the percentage of engineers and scientists taking more and more of the top spots.

On a broader scale the question is emerging whether the creation of new specialized agencies, re-organizations, shifting of functions from one agency to another, etc., and other makeshift decisions will suffice to handle the growing army of engineers and scientists who pervade the Federal establishment and who are rapidly assuming the responsibility for a major portion of the national budget. Last year Congress did some preliminary work on the question of establishing a Department of Science (AE/March, 1958) and is very likely to continue that study in the new session. There will be even stronger demands on The Hill that something be done to bring more order into the present "hodge-podge" of engineering and scientific operation following the public controversy over the transfer of the Army's space exploration operations to the National Aeronautics and Space Administration, and the President's compromise order which has quelled the furor, but failed to resolve the basic conflict.

Many feel that the real question behind that well-publicized difference of opinion is whether the nation can afford to have competing agencies overlap or duplicate the work of other agencies in the highly expensive technological area. The key agencies see it, moreover, as a matter of "life and death," for to lose their jurisdiction in the realm of engineering and science operations is to lose budget, staff and prestige—to become "second-rate powers" in the battle of Washington bureaucracy.

Under the Presidential compromise the Army will retain its Ballistic Missile Agency at Huntsville, Ala., with its 2,000 engineers and scientists under Dr. Wernher von Braun, but the Jet Propulsion Laboratory operated by Cal Tech was transferred from the Army to the civilian space agency, and with it more than $4 billion of operational funds. Even in Washington that's a lot of money! Dr. T. Keith Glennan, head of the space agency, had contended for the transfer of both facilities to his organization. Maj. Gen. John Medaris, head of the Army ballistic missile agency made an emergency flight to Washington to keep the Army in the missile business. At a joint news conference after the compromise settlement Dr. Glennan and Deputy Secretary of Defense Donald A. Quarles said cooperative arrangements would be followed at Huntsville and at the Cal Tech installation to serve each other's technical needs to the extent possible. Although the opposing officials talked of the "amicable" settlement most observers believe this episode was merely the first in a series as the technical power struggle develops. Dr. Glennan told newsmen that the

arrangement meant the civilian agency would have to try to build a duplicate technical staff, and it might take a year or so to find out if this was possible.

Another problem area in the technical world of Washington, in which a number of agencies have a finger in the pie, is that of technical information compilation, publication and dissemination. The President's Science Advisory Committee, headed by Presidential science adviser Dr. James R. Killian, Jr., recently filed a report on methods to improve the situation and the President has put the plan into operation. Under it the National Science Foundation will attempt to coordinate the various scientific information activities within the Federal Government. The group rejected the idea of a centralized technical information agency along the lines of the Russian All-Union Institute of Scientific Information on the ground that the development in the U. S. has relied heavily on private enterprise and the work of scientific societies, such as the well-known *Chemical Abstracts* of the American Chemical Society, with its 1957 budget of $1.5 million. The total private investment in the publication and dissemination of results of scientific research runs into many millions of dollars, the group found, commenting "The mere mechanics of transforming the existing decentralized system of private enterprise into a strong central agency are enough to stagger the imagination."

◄ Dr. T. Keith Glennan

Under the coordination plan the NSF will establish a Science Information Service, based on an expansion of the Foundation's previous work in this field. The ten or more Federal agencies presently engaged in abstracting, indexing, translating and distributing technical information will continue their own work, but will cooperate with the new centralized operation. According to the Killian Committee, the new Service will have the two functions of coordinating efforts of public and private organizations and encouraging and supporting fundamental long-term programs of research and development in the knowledge dissemination area, including the application of machine techniques and other improved methods of handling the veritable flood of technical data. There are approximately 50,000 scientific periodicals in a world list of 1952, and it is expected that by 1979 the total world output will reach 100,000 journals.

The Department of Commerce has moved to find new ways to meet the requirements of science and industry for services of the type the Department can provide, and better methods of relating the Commerce programs to the improving techniques afforded by scientific and technological progress. A committee appointed by the National Academy of Sciences, headed by Dr. Mervin J. Kelly, president of Bell Telephone Laboratories, will spend several months reviewing the operations of such Commerce units as Bureau of Public Roads, Maritime Administration, Patent Office, Weather Bureau, Coast and Geodetic Survey, National Bureau of Standards and Office of Technical Services.

The State Department has finally and formally capitulated to the Atomic-Space Age by re-establishing its overseas Science Officer Program. A science attaché program was launched in 1951 and was generally considered highly useful and valuable, but was allowed to lapse in 1956 for budgetary and other unspecified reasons. Since Sputnik I the Department has been seeking to recruit qualified personnel for the overseas posts.

Seven engineers and scientists have now been named to serve in London, Paris, Rome, Bonn, Stockholm, and Tokyo. Although assigned to a specific embassy, the Science Officer will also provide scientific assistance in embassies in adjacent areas. The appointments are for a period of two years and each of the appointees is said to have a facility with the language of the country of assignment.

Dr. Wernher von Braun ►

The announcement said the primary role of the Science Officer "will be to serve as an Adviser to the Ambassador and his staff in the evaluation of the interaction of science with foreign policy, the assessment of current scientific progress abroad and the enhancement of the liaison between United States and foreign scientists and engineers." Physics, Chemistry, Engineering, and Zoology are the disciplines represented in the initial appointments. Dr. Wallace R. Brode, science adviser to the Secretary of State, said additional appointments will be made soon for service in Russia, India and South America and Deputy Science Officers for all posts, except Paris. In re-activating the program the State Department noted that twenty-four countries have science attachés in their embassies in Washington, "attesting to the need and usefulness for representation of science in international affairs."

The examples in this report—space operations, information distribution, the needs of business, and international affairs—illustrate partially one of the basic questions in the proposals for a centralized Department of Science. Is the scientific and engineering function a service function, and thus most useful as an adjunct to the basic mission of the agency? Or, has the place of science and engineering become so all-powerful and all-important that it becomes a function in and of itself, needing its own organization at the policy-making level? There will be many words spilled over this question as the new Congress grapples with a new and dominant note in the forces which make up a government and national policy.

This Month's Authors . . .

Mr. Romer

Harold Romer is director of the Bureau of Sanitary Engineering, New York City Department of Health. He is in charge of the department's sanitary engineering programs affecting eight million residents in the City of New York. Indirectly, his work affects the health of an additional four million people in the metropolitan area. His responsibilities are basically in the fields of water supply control, sewage and refuse disposal, water pollution control, insect and rodent control, and phases of air pollution control.

He obtained his B.S. in 1935 and received a master of civil and sanitary engineering degree from New York University in 1942. His experience in sanitary engineering includes positions with the U.S. Corps of Engineers, the Construction Service of the U.S. Veterans Administration, the Sanitary Corps—U.S. Army, and as a consulting engineer.

△ △ △

Mr. Martin

Sylvan C. Martin, sanitary engineer director, is presently occupying the position of regional engineer of Regions I and II, United States Public Health Service at New York. As such he has supervision over the Public Health Service engineering programs for the ten northeastern states. These programs cover a wide range of sanitary engineering activities including water supply and water pollution control, air pollution control, radiation protection as related to water, air and food, interstate shipment of milk and shellfish, and supervision of sanitation of interstate carriers of all types.

Mr. Martin also represents the secretary of the Department and the Public Health Service on several water resource committees in the northeast area.

He obtained his bachelor's degree in civil engineering from Ohio State University in 1931 and remained there during the following year to obtain a Master of Science degree in sanitary bacteriology. From 1934 to 1936 he attended Iowa State College, taking postgraduate work in sanitary engineering at a doctorate level.

△ △ △

Mr. Roman

Carl A. Roman is employed as a division engineer (Substations) in the Lines and Substations Department of the Pennsylvania Power and Light Company. Graduating with an electrical engineering degree from Lafayette College, Easton, Pa., in 1949, he joined PP&L's Student Training Program for two years. He then was assigned for two years to the central office of the Lines & Substations Department in Hazelton, Pa., as a junior engineer and division engineer.

Mr. Roman has been located in PP&L's Lehigh Division of the Lines & Substations Department since 1953. He is a member of AIEE and the Lehigh Valley Chapter of the Pennsylvania SPE.

FLUORIDES

(Continued from page 24)

tions and commercial, industrial and manufacturing establishments in New York City yielded no opposition to proposed fluoridation. Letters of inquiry to health authorities of thirty-five municipalities, each with a population over 100,000 using fluoridated water, yielded no evidence of significant industrial or manufacturing problems.

Availability of Fluoride Compounds

Most of the fluoride produced in the United States is a by-product of the manufacture of acid phosphate for the fertilizer industry, or the manufacture of phosphoric acid. Operation of fertilizer plants is sometimes seasonal. As a result, deliveries of fluoride compounds, on occasion, have been delayed to the point where the concentration of fluoride had to be reduced or fluoridation was stopped.

Where short term interruptions occur, the over-all effect upon the anti-caries value of the water is negligible. This problem can be readily obviated, however, by providing sufficient tank capacity for storage of acid or adequate stockpiling. The supply problem will improve markedly, as demand increases, since more plants will go into the primary business of fluoride production to satisfy the demand.

Experience in Applying Fluorides

In any new application or procedure, it is likely that problems will occur. Problems have occurred in the application of fluorides to municipal drinking water supplies. None of the problems, however, has been difficult to resolve when in the hands of competent engineers and other technical personnel. Professor A. P. Black, in 1957, summarized[8] the situation: "Fluoridation has presented the water works industry with a challenge—another in a long series of challenges which have presented themselves in applying new advances to practices. As it has done so many times before, the industry and its people have met that challenge immediately, efficiently and completely."

On May 16, 1957, a panel discussion was held in Atlantic City during the annual convention of the American Water Works Association. The topic for discussion was, "Experience in Applying Fluorides".[8] The following material is abstracted from the remarks of participating engineers, water plant superintendents, etc., who have had extensive experience with the application of fluoridation:

R. J. Faust, executive assistant secretary of the American Water Works Association, summarizes the engineering aspects of water fluoridation: "The control of fluoride application presents no more difficulties than the control of a number of other water treatment chemicals. To the trained water plant operator, the control of all types of chemical treatment is a serious responsibility. Thus the control of fluoridation is not taken lightly but actually presents no greater difficulties to the operator than he is faced with routinely."[9]

—End.

---

[8] Journal, American Water Works Association, Vol. 49, No. 10, October, 1957.

[9] Faust, R.J., Executive Secretary, American Water Works Association, "Statement at the New York City Council Hearing on Water Fluoridation"—January, 26, 1956.

A Letter from the NSPE President:

The Professional Estate —What is it Worth?

Dr. Dunn

Dear Fellow Member:

"He who hath a profession has an estate."
—Benjamin Franklin

What Franklin implied was that a member of a profession has a valuable equity in his professional status and in consequence one worth preserving and striving to enhance. How much is this worth to each of us?

If we accept this concept, it then follows that engineers, at least until quite recently, either did not consider themselves members of an honored profession or perhaps what is worse did not place a very high valuation on the estate which they fell heir to by virtue of their professional status.

This may sound like a very harsh judgment but is it not true that we have failed to be diligent in supporting our profession, and in protecting it from those who have sought to trade on the good name of the engineer though not qualified?

A recent news article in some of our leading metropolitan papers referred to the fact that an individual had successfully posed as an "industrial engineer" in one of our sensitive government agencies by falsifying his educational and experience background to indicate graduation fron an eminent engineering school and considerable engineering experience. Subsequently it was determined that he neither went to this school nor had he the caliber of engineering experience to qualify him for the job. Certainly, had this particular agency required registration with its extensive screening process and verification of record, both educational and experience, this possible hazard to individuals and our security could have been eliminated.

During the last ten to fifteen years many engineers have recognized the need for action, but it has been difficult to find any unanimity of opinion as to the kind of organization that was needed to represent the engineer and the engineering profession even though excellent parallels and examples could be found in some of the other professions. The rapid growth in membership and effectiveness of the National Society is an indication that more and more engineers are recognizing the logical and effective aspects of the three-level organization with registration as the keystone. We also see evidence that engineers are beginning to realize the need for an organization devoting its entire energies to professional aspects of the engineering profession and that such an organization deserves the interest and active membership of qualified engineers dedicated to undertake projects and programs whenever and wherever they give promise of being of service to engineers and their profession.

Perhaps the best evidence of how well the National Society has met these needs and launched such programs is the fact that the budget can no longer be stretched to cover all of the programs and activities that are considered desirable and necessary, which along with the effects of the inflationary spiral accounts for the recommendation for the increase in the constitutional limitation on dues.

It is perhaps true that in the past engineers have not appreciated or adequately protected their professional estate, but there are many indications that this is changing rapidly. Engineers today have a stronger professional feeling and attitude than ever before, and this is even more evident among the members of NSPE. This is the reason for the firm belief that our members will not only approve the constitutional change and a $3 dues increase but will insure through their voluntary contributions that there is no lag in our programs during 1959.

Our profession is faced with ever-increasing responsibilities. Dr. Killian, special assistant to the President, said not long ago, "Perhaps there has been no time in the history of the engineering profession when its opportunities have been greater, its responsibilities more exacting, its need of self-appraisal and professional statesmanship more urgent."

To meet these problems, these responsibilities and these challenges requires adequate financing for the expanding programs of NSPE. We have been blessed by having passed on to us an estate whose value in these critical times cannot be measured. The members of NSPE must not fail to provide adequate financing to meet these challenges. It is for these reasons that I urgently urge all members of the Society to return their ballots and to indicate their willingness to support the nominal increase in dues proposed by your board of directors.

Clark A. Dunn,
NSPE President

NSPE Winter Meeting Slated Feb. 19-21 in Birmingham

- Announcement of 'Ambassador' Planned
- Founder Societies Extended Invitation

The first NSPE professional meeting for the year 1959 is scheduled February 19-21 at the Dinkler-Tutwiler Hotel in Birmingham, Alabama, and early program plans indicate that it will be a most important get-together.

As usual, the Executive Committee will convene a day earlier, February 18, with the Board slated to meet on Thursday evening, February 19.

Highlight of the winter session will be the naming of the NSPE "Ambassador," who will soon be chosen following the close of the Voluntary Fund Campaign. The announcement will be made before final adjournment on Saturday.

The meeting will also kick-off the National Engineers' Week observance. Special showings of the one-minute television films plus a showing of the 15-minute radio program, "Engineering . . . for the Age of Space" are on the agenda.

Dr. John M. Gallalee, president emeritus of the University of Alabama and chairman of the Alabama State Board for Registration of Professional Engineers and Land Surveyors, will give the welcome address at the opening event.

Main speaker for the Friday banquet is Arthur V. Wiebel, president of the Tennessee Coal & Iron Division of the U. S. Steel Corporation.

Following action approved by the Board at the fall meeting in San Francisco, NSPE President Clark A. Dunn has issued an invitation to the Founder Societies to designate an official representative to attend the National Society's meeting in February as well as all future sessions.

Professional meetings dominate the program with many committee reports to be presented. In addition to the business matters, a full social program has been planned for both members and their wives.

Serving as general co-chairmen for the meeting are W. C. Reynolds, Jr., and Harold McFadden. The various other committee chairmen include Joseph Moxley, program; Belton Y. Cooper, publicity; Wallace McRoy, registration, and James A. Evans, facilities.

The complete program follows:

WEDNESDAY, FEBRUARY 18, 1959

9:00 a.m.—5:00 p.m. Executive Committee Meeting ..... **Iron Room**

THURSDAY, FEBRUARY 19, 1959

9:00 a.m.—5:00 p.m. Executive Committee Meeting ..... **Topaz Room**

6:00 p.m. Social Hour

7:00 p.m. Opening Dinner ... **Terrace Room**

Presiding: President Clark A. Dunn

Invocation—T. M. Francis
Welcome Address—Dr. John M. Gallalee

President's Report

Professional Meeting Convenes

Roll Call of Members of the Board
Communications
Petitions of New State Societies
Executive Director's Report
Treasurer's Report
Executive Committee's Report

FRIDAY, FEBRUARY 20, 1959

8:00 a.m. Professional Meeting Continues ..... **Dinkler Room**

Professional Development Group—Vice President Mosher, presiding

Report on the Development of Revisions to the Model Law
Robert Williamson, Chairman, Registration Committee

Status of the NSPE Scholarship Program
Leland Hobson, Chairman, Scholarship Committee

Young Engineers' Activities
Arthur Gompf, Chairman, Young Engineers Committee

Status of Student Chapters
J. Neils Thompson, Chairman, Student Chapters Committee

Professional Employment Group—Vice President Hindermann, presiding

Ethical Studies
Marcus Durlach, Jr., Chairman, Ethical Practices Committee

Plans to Serve the Engineer in Government
L. N. White, Chairman, Functional Section for Engineers in Government

Because of its natural resources, Birmingham is an important industrial center of the Southeast. Coal, iron ore, and limestone, the three essentials for making steel are available in commercial quantities. A night view is shown of a blast furnace in full operation.

LADIES PROGRAM

Thursday, February 18, 1959

6:00 p.m. Social Hour ..... Terrace Room
7:00 p.m. Opening Dinner ..... Terrace Room

Friday, February 20, 1959

10:00 a.m. Ladies meet for tours
1:00 p.m. Ladies Luncheon ..... The Club
6:00 p.m. Social Hour ..... Ballroom
7:00 p.m. Banquet ..... Dinkler Room

City of Birmingham

View across the valley of the City of Birmingham—fastest growing business community in the deep South, more than 600,000 people live in this valley.

Expansion of Student Contact Program
Unionization Developments in Industry and Government
Harry P. Cooper, Chairman, Engineers-in-Industry Subcommittee

Status of Self-Employed Retirement Legislation

Implications of Supreme Court Wage-Hour Law Decision

Implications of Supreme Court Decision on Professional Voting

Rights (Taft-Hartley)
Leslie C. Gates, Chairman, Functional Section for Consulting Engineers in Private Practice

12:30 Regional Luncheons

Vulcan

Statue of Vulcan, Roman god of the forge, and symbol of the iron and steel wealth of Birmingham, Alabama. It is the second largest statue in the United States.

2:00 p.m. Professional Relations Group—Vice President Hull, presiding

Standard Contract Forms for Engineer-Architect Agreements
Wm. F. Moehlman, Chairman, Interprofessional Relations Committee

Developments in the Functional Plan Activities
Garvin H. Dyer, Chairman, Inter-Society Relations Committee

Public Relations Group—Vice President McGaughy, presiding

Kick-Off of the 1959 Engineers' Week:

Special Showing of Spot TV Films
Premiere of 15-minute radio show "Engineering . . . for the Age of Space."
John Bahr, Chairman, Engineers' Week Committee

Organizational Functions Group—Vice President Durkee, presiding

Financial Aspects of the American Engineer Operation
G. Ross Henninger, Chairman, American Engineer Committee

Progress Report on Engineering Technicians' Program
A. C. Friel, Chairman, Committee on Engineering Technicians

Report on Introductory Membership Plan
Thomas T. Mann, Chairman, Membership Committee

6:00 p.m. Social Hour .....Ballroom

7:00 p.m. Banquet .....Dinkler Room

Invocation—Bishop C. C. J. Carpenter

Introduction of Head Table

Principal Speaker—Arthur V. Wiebel, President, Tennessee Coal & Iron Division, U. S. Steel Corporation

SATURDAY, FEBRUARY 21, 1959

8:00 a.m. Policy Operations Group—Vice President Easley, presiding

Voluntary Fund Campaign
John Coleman, Chairman, Society Income Committee

Report of Budget Committee
L. E. Easley, Chairman, Budget Committee

Report of Constitution and Bylaws Committee
Sam Hawkins, Chairman, Constitution and Bylaws Committee

The Stake of the Professional Employee in Labor Legislation

New Moves for Federal Engineering Scholarships
Robert F. Miller, Chairman, Legislative Committee

PROGRESS REPORT ON SILVER ANNIVERSARY MEETING

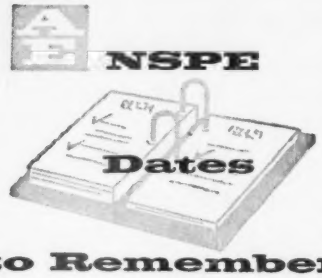
LOCATION OF 1961 MEETINGS

ANNOUNCEMENT OF NSPE AMBASSADOR

RESOLUTIONS

NEW BUSINESS

1:00 p.m. Adjournment



to Remember

Professional Engineers of North Carolina—Annual Meeting, January 8-10, 1959, Barringer Hotel, Charlotte, North Carolina.

Louisiana Engineering Society—Annual Meeting, January 15-16, 1959, St. Charles Hotel, New Orleans, Louisiana.

Mississippi Society of Professional Engineers—Annual Meeting, January 16-17, 1959, King Edward Hotel, Jackson, Mississippi.

Texas Society of Professional Engineers—Annual Meeting, January 22-24, 1959, Shamrock Hilton Hotel, Houston, Texas.

Oklahoma Society of Professional Engineers—Annual Meeting, January 30-31, 1959, Mayo Hotel, Tulsa, Oklahoma.

National Society of Professional Engineers—Winter Meeting, February 19-21, 1959, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

National Society of Professional Engineers—Annual Meeting, June 17-20, 1959, Commodore Hotel, New York, New York.

Idaho Society of Professional Engineers—Annual Meeting, February 5-7, 1959, Boise Hotel, Boise, Idaho.

Nebraska Society of Professional Engineers—Annual Meeting, February 12, 1959, Lincoln Hotel, Lincoln, Nebraska.

New Mexico Society of Professional Engineers—Annual Meeting, February 22, 1959, Alvarado Hotel, Albuquerque, New Mexico.

Iowa Engineering Society—Annual Meeting, February 24-25, 1959, Ft. Des Moines Hotel, Des Moines, Iowa.

Minnesota Society of Professional Engineers—Annual Meeting, February 25-27, 1959, Pick-Nicollet Hotel, Minneapolis, Minnesota.

Wyoming Society of Professional Engineers—Annual Meeting, February 26, 1959, Laramie, Wyoming.

Tennessee Society of Professional Engineers—Annual Meeting, February 27-28, 1959, Patten Hotel, Chattanooga, Tennessee.

Kansas Engineering Society—Annual Meeting, February 26-28, 1959, Lamer Hotel, Salina, Kansas.

Maryland Leads Membership In Fund Drive Contributions

- 'Golden Dozen' Listing Announced
- About $50,000 Contributed to Date

Maryland, the Free State, is heading for top honors in the number of members who have contributed to the "Project Ambassador" fund raising drive. Professional engineers in the land of oyster beds and tobacco farms, to date have come through with an impressive 16.4 per cent of the state society's membership writing checks for the fund. They lead, too, in the amount contributed per member, with $1.72 being chalked up for every name on the roster of the East Coast Society.

Two comparatively new NSPE societies, Mississippi and Louisiana, heaped pride on the Deep South by seizing second and fourth places, respectively, in the amount of money contributed per member thus far. And to complete the half-circle around the United States, California occupies third place in the amount of money contributed per member, and fifth in percentage of members contributing to the drive. Alabama came in second in the percentage contributing listing with Louisiana running third, and Connecticut fourth.

The remainder of those on the "Golden Dozen" listing and how they fared can be seen in the figures reproduced in the chart opposite.

NSPE President Clark A. Dunn has announced that the amount of money contributed to date has now reached $50,000 with about 4,500 members sending in their checks.

"We are making progress," Dunn said, "but their seems little reason for our not doubling this amount in the next month or two."

Dr. Dunn once again stressed the fact that even if the dues increase is voted by the membership in January no funds from this source will be available for 1959. That means that such outstanding programs as National Engineers' Week, the employment practices activity, and others will have to be drastically curtailed or stopped altogether.

One unique feature of the drive is the "Project Ambassador" program. All who contribute at least a dollar for every year he has been registered, are eligible for a free trip to one of the following areas of the world: England and Western Europe; Central and South America; Southeast Asia and Australia-New Zealand, or Canada.

All those who qualify must submit along with their contribution a résumé of their experience and background. From these résumés a panel of distinguished judges will select one engineer who along with his wife, will be sent as a goodwill ambassador to visit professional engineering societies in other countries, as well as outstanding engineering and scientific installations.

The résumé should include positions the engineer has held during the past five years; contributions made by the man to industry, the public welfare, the engineering profession, and the community. Further, it should list participation in civic, fraternal and professional organizations.

This assignment as goodwill ambassador is open to all members of NSPE except, for obvious reasons, some elected officers. There are no rigid rules, other than those outlined, to dictate the type of person that the judges may choose. It may be a young, dynamic engineer who has, in the judges' minds, a fresh and progressive outlook or they may choose an older, widely-experienced engineer because of his maturity. In any case, the engineer selected will enjoy a once-in-a-lifetime trip for two to a distant quarter of the world—first class, all expenses paid—not to mention the great honor of being selected.

Judges for "Project Ambassador" are C. Y. Thomas, vice president, Spencer Chemical Co.; William F. Ryan, former vice president, Stone & Webster Engineering Corp., and A. A. Potter, dean emeritus of engineering, Purdue University.

Another unique feature of the campaign is the availability of a personalized desk name plate to all those who contribute $10 or more. The name plate is attractively designed, and the name of the contributor is printed in bold white letters, on a choice of gray, black or walnut background.

PROJECT AMBASSADOR STANDINGS

	Contribution per Member		Per cent of Membership Contributing	
1	Maryland	$1.72	Maryland	16.4%
2	Mississippi	1.69	Alabama	15.7
3	California	1.62	Louisiana	15.4
4	Louisiana	1.53	Connecticut	14.4
5	Alabama	1.52	California	13.7
6	Connecticut	1.46	Illinois	13.5
7	North Dakota	1.42	Utah	11.9
8	Puerto Rico	1.39	Idaho	11.9
9	Utah	1.38	North Carolina	11.7
10	Illinois	1.32	Kansas	11.6
11	New Mexico	1.24	Puerto Rico	11.6
12	Virginia	1.23	Canal Zone	11.5

Broad TV Coverage Planned For Engineers' Week in Feb.

- One-minute Films Widely Distributed
- Promotional Material Emphasizes Theme

Widespread distribution to local and network television stations is planned for the one-minute TV films available for the 1959 National Engineers' Week, February 22-28.

Chapter requests for the films indicate a broad TV coverage this year at the local level. Many chapters have ordered several sets of the films for use on stations throughout the area.

Produced for the National Society, the films are designed to call attention to Engineers' Week and point out the role played by engineering in bringing about the new era which we are now entering—the era of the exploration of the solar system and beyond. The still photographs on this page show typical scenes from the films.

The five films include scenes of the satellite computing center in Washington, D.C., a rocket firing at Cape Canaveral, the world's largest radio telescope, atomic reactor experiments, and satellite construction. The narration behind the films is centered around the theme for the 1959 Week—"Engineering . . . for the Age of Space."

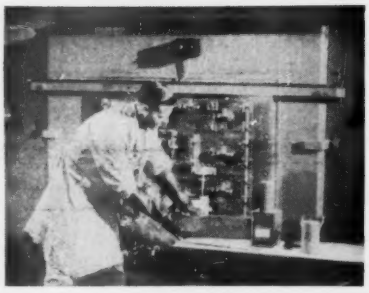
The films are available in sets of five 16mm prints from the National Society at a cost of $25 per set. All films will qualify for public service time during TV station breaks.

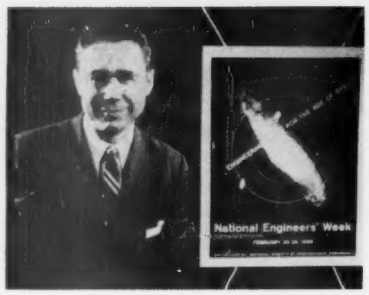
The National Society is offering 35mm prints of the films to sponsors of major network programs for use during the week of February 22-28. The sponsors of these programs represent the chemical, electrical, steel, aluminum, and atomic industries. The February issue of the AMERICAN ENGINEER will list the network programs which will use the films.

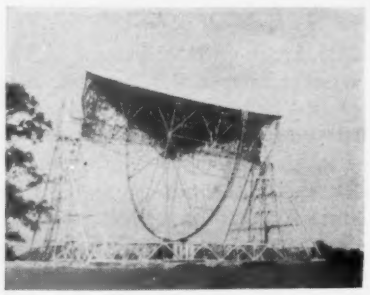
Other promotional material offered by the National Society also emphasizes the theme of the 1959 Week. Advance reports from chapter and state society Engineers' Week committee chairmen indicate that the theme will be used in career conferences for high school juniors and seniors, exhibits on engineering achievements, and a number of projects illustrating the importance of a sound educational background in mathematics and the physical sciences.

Approximately 8,000 copies of the Engineers' Week booklet entitled "A Program in Public Service for Your Firm" are being distributed to industry executives. Copies were mailed to a list of 800 industrial executives and to a list of more than 100 engineering executives who inquired about the events of Engineers' Week. Copies of the booklet are still available—at no charge—to local chapters and state societies. The booklet describes the objectives of the Week, and points out how industry can participate through guided tours, poster display, exhibits, and other projects.

As listed on the opposite page, a selection of other promotional material for the Week is again offered by the National Society. This material includes radio tape recordings, posters, banners, logotypes, newspaper mat stories, lapel buttons, and gummed seals. A series of Action Letters concerning promotional aids has been sent to all NSPE affiliates.

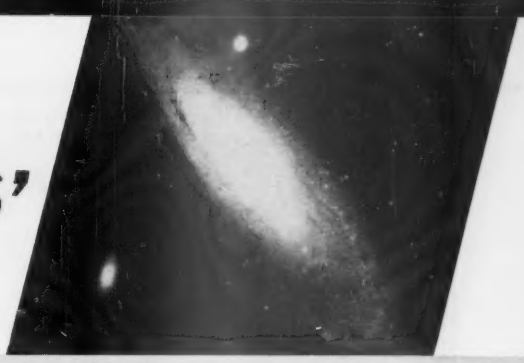






Use these aids for

NATIONAL ENGINEERS' WEEK . . .



HERE ARE the basic promotional aids that will give dramatic impact to your program—the kind of impact that will result in public attention in local newspapers, and on radio and television programs. All these aids have been prepared to show the contributions of engineering to our modern age. Use the handy order coupon below.

1. **One-Minute TV Films:** A set of five one-minute TV films dramatizing the theme of the 1959 National Engineers' Week. Produced under expert supervision to meet network standards, the films call attention to role of the engineer in building for the "age of space." Network TV performers. Each film planned to qualify for public service TV time during station breaks. A set of these five films will give wide coverage to your Engineers' Week program. Price: Set of five films, $25.

2. **"Engineering . . . for the Age of Space:"** A 15-minute tape recorded radio program telling the story of how engineering is bringing about man's new era. Radio network performers dramatize the contributions of the engineer in meeting the challenges that are involved in the exploration of our solar system and beyond. Excellent for use on public service radio time. Price: $6 each.

3. **Lapel Buttons:** A high-quality lapel badge featuring a white design on a blue background. May be distributed to high schools, science clubs, and other groups. Each chapter or state society can set its own price for button sales. Prices: 100 to 500—15¢ each; 500 to 1,000—10¢; 1,000 to 3,000—7¢; 3,000 to 5,000—5¢; and over 5,000—4¢.

4. **Set of Seven TV Slides:** Obtain extensive TV coverage through the Week with these slides displaying poster-type art work and printed copy calling attention to engineering. May be used during all TV station breaks as public service announcements. Price: $10 per set of 7 slides.

5. **Posters:** Colorful 9 x 11-inch pasteboard posters carrying the 1959 Engineers' Week design and theme. This is the basic promotional item for calling attention to the Week. Use on bulletin boards, in window displays, school exhibits, etc. Large size (18 x 22 inches) also available. Prices: 9 x 11, $4 per 100; 18 x 22, $5 per 100.

6. **Paper Banners:** Excellent for display use. Three feet long by 6 inches wide. Has poster design and words "National Engineers' Week" in color. Price: $4 per 100.

7. **National Engineers' Week Seals:** Use these brightly colored seals on all office mail from now through February 28. Poster design printed on 1½-inch gummed paper. Price: $3 per 1,000.

8. **Newspaper Mat Story on Engineers and the Exploration of Our Solar System:** A feature article on the way in which engineering is providing factual answers to questions that only a few years ago were strictly in the realm of speculation. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 50¢ each.

9. **Newspaper Mat Story on What Kind of Educational Background a Graduate Engineer Needs Today:** A feature article on the extent of secondary and college education needed for an engineering degree. Emphasizes the importance of a solid foundation in mathematics and the physical sciences. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 50¢ each.

10. **Logotype:** A metal cut of a poster design to insert in advertising, special sections of newspapers, industrial house organs, magazines, and other printed matter. All state society and chapter publications should have one. Price: $1 each.

11. **"Engineering Builds Broader Horizons:"** A re-issue of the 15-minute tape recorded radio program distributed last year. Just as timely this year. Network performers dramatize the engineering developments behind every phase of the International Geophysical Year. Price: $4 each.

Use this coupon to order your aids now!

National Society of Professional Engineers
2029 K Street, N.W.
Washington 6, D. C.
Sirs:

Please rush me items indicated. I enclose a (check.....) (money order.....) in the amount of $..... I understand remittance must accompany order.

NAME_____
(PLEASE PRINT)

ADDRESS_____

CITY_____STATE_____

1. .....One-minute TV films @ $25 per set.
2. .....Radio tape "Engineering . . . for the Age of Space" @ $6 each.
3. .....Lapel buttons: 100-500 @ 15c ea.; 500-1,000 @ 10c ea.; 1,000-3,000 @ 7c ea.; 3,000-5,000 @ 5c ea.; over 5,000 @ 4c ea.
4. .....TV slides: set of 7 slides @ $10 per set.
5. .....Posters: regular size @ $4 per 100.
   .....Posters: large size @ $5 per 100.
6. .....Banners @ $4 per 100.
7. .....Seals @ $3 per 1,000.
8. .....Newspaper mat story on engineers and the exploration of our solar system @ 50c ea.
9. .....Newspaper mat story on educational background for engineering @ 50c ea.
10. .....Logotypes @ $1 ea.
11. .....Radio tape "Engineering Builds Broader Horizons" @ $4 ea.

Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

The Dormant PECBI

SEVERAL years ago NSPE, recognizing the need for research on a number of perplexing professional problems, created the Professional Engineers Conference Board for Industry. Its research resulting in the five Executive Research Surveys to date has undoubtedly contributed greatly to a better understanding of the professional engineer, his work, motivations, and importance in our increasingly-complex technical economy.

THE Conference Board is composed of some thirty professional engineers who hold positions of industrial leadership throughout the country. This group meets each year at the time of NSPE's annual meeting and considers important areas of research which would shed continuing light on the complex elements of our profession. Several years ago as a result of the considerations of the Board itself and a survey of some 300 additional industrial engineering leaders it presented some thirty-five areas of research on which additional information is needed to better understand our profession and the engineers who comprise it. These cover a broad spectrum of professional interest. The studies proposed are in the fields of education, employment practices, ethical practices, registration, young engineers and national defense, to mention only a few. A number of these studies are the direct result of observations resulting from previous PECBI research. Several of these touched upon areas on which a much deeper evaluation should be made to determine the cause and effect of the statistics observed. To mention only a few of the areas of study, one of the PECBI surveys indicated that one out of every two engineers aspires to a management position. Why? Another might involve a tabulation of the desire of industry as to the characteristics required of engineering graduates. A separate study would be desirable to determine how the performance of engineering personnel is evaluated most effectively. Also, from a recent PECBI survey came the disturbing fact that registration has not been widely accepted by engineers in some industry. Why? These are typical of many questions on which the pattern of the PECBI research, probably by the depth interview technique, could shed extensive light on important problems facing the engineering profession.

UNFORTUNATELY, research of the magnitude and the caliber not only needed to make such research valuable but to carry on the caliber of the previous PECBI research requires considerable financial underwriting. The principal source of funds for the PECBI has been the budget of NSPE. As the Society's programs have increased and the cost of services to members has been hit by the inflationary spiral, NSPE funds have been taxed beyond their capacity to provide financing for this essential research. If NSPE is to accurately reflect some of the more involved aspects of the composition of our profession, the motivations of professional engineers, and the atmosphere in which they can best contribute to our economy, the research of the PECBI is essential.

THIS is one of the important areas for which financing would be provided if the dues increase to be voted on shortly by the members is approved.

Scholarship Material Sent to Chapters

Literature for implementation of the Armco-NSPE Civil Engineering Scholarships program have recently been distributed to chapter presidents. In an accompanying memorandum, Leland Hobson, chairman of NSPE's Scholarship Committee, pointed out that chapters must forward their scholarship selections to the state committee by January 15.

At the request of Armco Drainage and Metal Products, Inc., the Armco Foundation is providing five $3,000 civil engineering scholarships during the school terms which begins in the fall of 1959. The recipients may attend the accredited college of their choice.

Each state society scholarship committee will select one candidate from the applications received from the local chapters. The state winner will then be asked to take a series of psychological and aptitude tests, which will be scored by the Armco Company. A national selection committee appointed by NSPE and Armco will make the final selection of the scholarship winners who will be chosen on a regional basis.

R. E. Eppinger Named Florida Ex. Director

Russell F. Eppinger, of Jefferson City, Mo., has recently been selected as executive director of the Florida Engineering Society.

Mr. Eppinger, who has a background in newspaper and public relations work, assumed his new position in November.

The Florida group plans to move the Society headquarters from Gainesville to Orlando early this year.

Robbins, Dunn Attend Recent Meetings

Paul H. Robbins, executive director of the National Society, spoke recently at the annual meetings of the Virginia SPE and the New Mexico SPE, and at a meeting of the Delaware Society. In addition, he attended, along with NSPE President Clark A. Dunn, the annual meeting of the American Society of Mechanical Engineers in New York City.

Mr. Robbins also participated in a panel discussion at a meeting of the District of Columbia Section of the American Society of Civil Engineers. The executive director represented NSPE at the annual meeting of the American Association for the Advancement of Science. He serves as a member of the AAAS Judging Committee for the Newcomb Cleveland Prize.

New 'Brainstorming' Plan Used in Texas

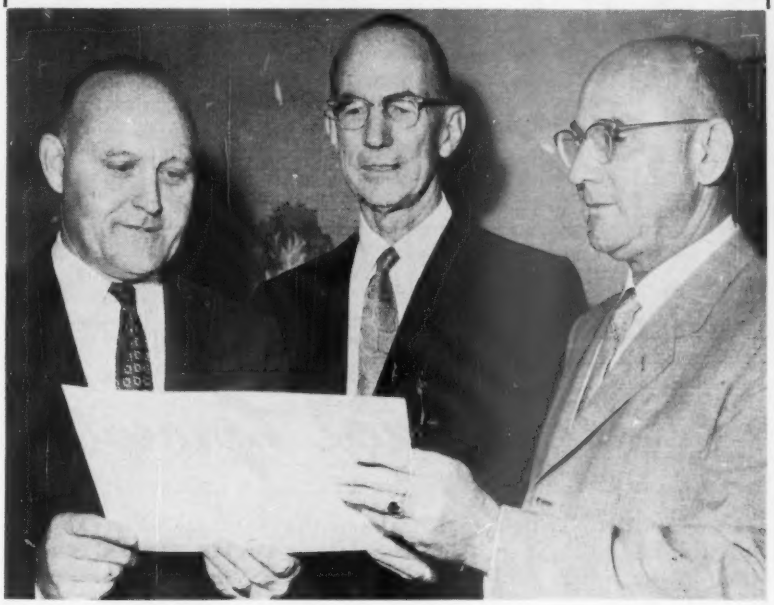
Utilizing the newest tool for "idea-making," the Texas Society of Professional Engineers recently went to a public relations class at the University of Texas for a "brainstorming" session and posed the question, "What can local chapters of TSPE do to increase the prestige, respect and general status of the professional engineer?"

In thirty-five minutes, the class, under the direction of Dr. Alan Scott, produced sixty-one ideas! This "trial run" brainstorming session came as a result of the plan of the TSPE Public Relations Committee to use this new method at the Public Relations Chairman's Workshop during their annual meeting, January 22-24, in Houston.

Gus F. White, executive secretary of TSPE, and Gloria Allen, public relations director, have been laying the groundwork for extensive use of "brainstorming" to search out new ideas for membership, public relations, dues delinquents, "drop" members, and chapter activities.

Those desiring copies of the TSPE "brainstorm" session should write: TSPE, 1008 San Jacinto, Tex.

Past Presidents Honored

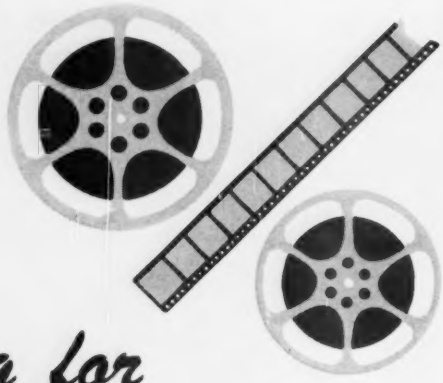


The past presidents of the Travis Chapter, Texas SPE, were recently honored at a banquet. Shown among the dignitaries are, l.-r.: C. H. Novotny, past president of the Austin Chapter who now lives in Houston; H. B. Zachry, H. B. Zachry Company, San Antonio, and Olaf T. Lodal, Lodal and Associates, San Antonio, vice president of the Texas Society. Mr. Zachry, a member of Bexar Chapter, was the speaker for the evening.

Discuss Functional Plan

The AIEE Functional Plan was the discussion topic for a panel of distinguished speakers at a recent meeting of the Toledo Society of Professional Engineers. The Founder Societies were invited to participate in the program. The speakers were, l.-r.: (standing) Ralph C. Girkins, president, TSPE; E. Alfred Picardi, president, Toledo Chapter, American Society of Civil Engineers; W. H. Schwalbert, chairman, Toledo Chapter, American Institute of Electrical Engineers, and John T. Davey, chairman, Toledo Chapter, American Society of Mechanical Engineers; (seated) S. L. Stolte, past president (1950-51), NSPE; E. Lawrence Chandler, assistant secretary, ASCE; Julius C. Strasbourger, director, AIEE, and Arthur B. Heiberg, long active in Region 5, ASME.

NSPE Presents:



"Building for Professional Growth"

Here is a film covering the activities of the National Society of Professional Engineers at the chapter, state, and national levels. A milestone in the NSPE public relations program, "Building for Professional Growth" is a filmed presentation on the values and benefits of Society membership. Activities covered in the film include NSPE efforts in registration; research projects such as the Income and Salary Survey, the Professional Engineers Conference Board for Industry reports; legislative cooperation; National Engineers' Week, and other programs. Also included are scenes from actual chapter, state, and national level meetings.

"Building for Professional Growth" can be shown on any 16mm sound projector. Reservation requests should be made for three choices of dates. Notification of available date will be sent from NSPE headquarters immediately after each reservation request is received.

RENTAL FEE: $10

(Includes 8-page booklet "Ideas For Your NSPE Film Program," and 15-minute talk on NSPE.)

Use this coupon to reserve your film

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
2029 K St., N.W. • Washington 6, D. C.

Please reserve us the NSPE film "Building for Professional Growth" for the following choice of dates:

_____ (1st) _____ (2nd) _____ (3rd)

SHIP TO:

Name_____

Street_____

City_____ Postal Zone_____ State_____

(Make checks payable to National Society of Professional Engineers)

WITH THE *Auxiliaries*

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

Our auxiliary movement continues to grow! As most recent evidence, the wives of the members of the Southeastern Chapter of New Mexico met in November and organized an auxiliary. Their first meeting consisted of the business of organizing and a program showing the latest Christmas toys and hobbies, with dinner at La Posta. The organizing of this auxiliary makes New Mexico the second state to have auxiliaries in all of its chapters. Also the wives of the Eastern Chapter of Missouri have organized an auxiliary. This is the group of St. Louis women who were the efficient hostesses at the annual meeting last June. They found a fellowship in common interests which they wished to extend and expand, forming an auxiliary was a logical step in this direction. This is a large and active chapter and an auxiliary will fit very well into its plans and activities.

The Ladies Auxiliary Insignia has been fashioned into an attractive gold and enamelled pin. It is available from national headquarters at $5 each.

Practically all auxiliaries are reporting a healthy increase in membership. The Central (Arizona) Chapter Auxiliary held a coffee for all wives of that chapter, sending out 250 invitations and as a result gained a number of new members. The Smoky Valley Chapter of Salina, Kansas, has doubled its membership in the past year. This auxiliary is now busily engaged in

plans for their State meeting, February 26-28.

The Lorain (Ohio) Chapter Auxiliary had a tour of the Ford Division of the Ford Motor Company in Lorain in November which was well attended. The Cleveland (Ohio) Chapter Auxiliary reports a record attendance for their November meeting, at which a film on the building of the Mackinac Bridge was shown.

The Mahoning Valley (Ohio) Chapter Auxiliary were recent hostesses to members of the Medical Auxiliary at a luncheon at Youngstown. The speaker was Rev. A. M. Land of Youngstown University, whose topic was "Philosophy and Common Sense."

The Pasadena (California) Chapter Auxiliary is a fairly small, but active group. Ten of their members attended the fall Board meeting in San Francisco. On November 10 they held a fashion show-luncheon at the Huntington-Sheraton. On December 10 they sponsored the annual Christmas party for the families at the Hillcrest Cafe. Following dinner was entertainment, dancing, and the highlight was the breaking of a huge piñata.

The fall Board meeting in San Francisco was well attended by wives of the members, and they were well rewarded by the excellent entertainment provided for the ladies, which consisted chiefly of tours of that fascinating region, with a beautiful luncheon at the Claremont Hotel in Berkeley on the last day. Ample time was provided for the stimulating activity of becoming better acquainted and exchanging worthwhile ideas for more interesting auxiliary gatherings.

Mrs. Calvin G. Ellis, of Fresno, California, reports that their September meeting was a brunch at the Sierra Sky Ranch in the mountains about forty miles from Fresno. Their dinner dance was held in November at the Sunnyside Country Club with a theme "Sea Foam Fantasy." The Fresno Auxiliary has eighty active members, and has long been a most active auxiliary.

From Hammond, Indiana, the Calumet Auxiliary report their opening meeting this fall was a "Summer Round-up," which was well attended. For the October meeting they had a most interesting talk and demonstration on "Making Hors'd' oeuvres." The highlight of their year was the annual dinner dance in November.

The Little Rock, Arkansas, Auxiliary held a coffee honoring new members and held a bridge and canasta party. The Santa Fe, New Mexico, Chapter Auxiliary held a membership coffee resulting in twelve new members, and a luncheon with "Flower Arranging" as the subject of the program.

Payme County Chapter Auxiliary, Stillwater, Oklahoma, gave $20 to Engineerettes (wives of students) for their Registration Tea.

The Weirton, West Virginia, Auxiliary reports the October meeting was held at Fort Steuben Hotel in Steubenville, Ohio, with Mrs. Robert W. Reynolds, associate judge of the Ohio Association of Garden Clubs, conducting a workshop in creating everlasting corsages. With her instruction and help each member and guest made a lovely corsage.

CLASSIFIED ADVERTISING

Minimum 3 lines.
Undisplayed, $1.80 per line. Three or more consecutive insertions $1.50 per line each.
Displayed: Same rate as General Advertising.
Positions Wanted: Undisplayed, 90¢ per line. Three or more consecutive insertions 75¢ per line each. Displayed: General Advertising rates, less 50%.
Box Number chargeable as one line.

Mail Box Number replies to:
AMERICAN ENGINEER
2029 K Street, N.W. Washington 6, D.C.

Position Available

FOREST FIRE RESEARCH

Salary $7500 to $10,000

United States Department of Agriculture, Forest Service opening new laboratory near Macon, Georgia, for fundamental research in forest fire behavior. Need men with training and research experience in the thermodynamics, fluid mechanics, heat transfer and energy release in combustion process of free burning fire, or related fields.

Positions will be filled in accordance with Civil Service requirements.

Opportunity for pioneering research, promotion, and interesting career, also important fringe benefits.

Direct inquiries, **Southeastern Forest Experiment Station, Section C-1, United States Department of Agriculture, Forest Service, Asheville, N. C.**

Use the Classified Section of the AMERICAN ENGINEER to Reach More Than 50,000 Readers.

New Oklahoma SPE Officers

New officers of the Oklahoma SPE are shown, l.-r.: (seated) Joseph L. Cottrell, membership vice president; Gordon A. McCune, programs and meetings vice president; Claud M. Gordon, president, and Melvin J. Peterson, executive vice president; (standing) W. R. Clarke, director; Max T. Nigh, director; Norman M. Hulings, public relations vice president, and Jack B. Cornett, secretary-treasurer.

New York Chapter Sponsors Course

The Schenectady Professional Engineers Society, a chapter of the New York State SPE, recently sponsored a six-week course titled "Securities and Investing" for members and guests in cooperation with three brokers' representatives.

The sessions were held in the classrooms of the Linton high school and covered principles of capitalism, investment analysis, speculation, growth, income investments, stocks, bonds, and mutual companies.

Each of the first five sessions was conducted in turn by one of the three brokers' representatives from Bache and Company, Spencer Trask Company, and Foster and Adams. The sixth session was a panel discussion with questions presented from the floor. Approximately forty members and twenty guests enrolled in the course.

Discussion Held On Public Affairs

The second North Shore Chapter meeting of the 1958-59 season was held in November with about sixty members attending the dinner meeting and panel discussion on the subject "Engineers in Public Affairs."

Participating in the program of the Massachusetts Chapter was Wesley E. Horton, treasurer of Colonial Management Associates and Colonial Distributors Incorporated, Boston, who served as moderator. Other panel members included Walter L. Abel, assistant director-research division, United Shoe Machinery Corporation, Beverly; Edward Wool, manager of engineering, Small Aircraft Engine Department, General Electric Company, Lynn, and Allan W. Lord, section supervisor, research and development engineering, Bomac Laboratories Incorporated.

In his introductory remarks Mr. Horton cited the present State debt of more than $700,000,000 as a specific example of the need for active support and leadership in all sorts of public affairs, and asked the question "Can engineers afford *not* to be active in public affairs?"

Certificates of Registration

Certificates of registration as professional engineers were presented to five men at a recent meeting of the Southwestern Chapter of the Indiana SPE. Herman A. Moench, dean of engineering at Rose Polytechnic Institute presented the certificates. Dean Moench, a member of the Indiana State Board of Registration for Professional Engineers and Land Surveyors, emphasized the point that "Professional engineers are members of an honorable and learned profession and as such should dedicate their professional knowledge and skill to the advancement and betterment of human welfare." William E. Shaw, EIT, was program chairman for the meeting which was held as a part of Young Engineers' Month. Shown receiving the certificates are, l.-r.: Vinal S. Purdy; John L. Buthod; Henry Lee Stone; William E. Kreisle; Jack Arthur Mason, and Dean Moench.

Dr. Dunn in Chicago

Dr. Clark A. Dunn, president of the NSPE, meets with prominent engineers of the Chicago Chapter of the Illinois Society of Professional Engineers at the University Club, Chicago, during a three-day visit to the area on Nov. 12, 13 and 14. Seated, l.-r., are: Dudley Terrill, Dr. Dunn, and George Chlebicki. Standing: E. M. Fucik and Linas Brown, Chicago Chapter president.

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Alabama-Louisiana

PALMER AND BAKER ENGINEERS, INC.
Consulting Engineers—Architects

Surveys, Reports, Design, Supervision, Consultation, Traffic Problems, Tunnels, Bridges, Highways, Airports, Industrial Buildings, Waterfront & Harbor Structures, Complete Soils, Materials & Chemical Laboratories.

Mobile, Ala. **New Orleans, La.**
Washington, D. C.

FRANKLIN ENGINEERING
Physicists, Engineers

Plans, specifications, investigations, reports. Consultants in design of research facilities and special equipment Power distribution, Control, High Voltage, Emergency power, Nuclear shielding

977 Commercial Street **Palo Alto, Calif.**
Phone Davenport 1-4114

INTERNATIONAL ENGINEERING COMPANY, INC.
Design and Consulting Engineers

Dams — Power Plants — Tranmission Lines Railroads — Highways Investigations — Reports — Plans and Specifications — Cost Estimates — Supervision of Construction

74 New Montgomery Street
San Francisco 5, Calif.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

KAISER ENGINEERS

Division of Henry J. Kaiser Company

ENGINEERS — CONTRACTORS

1924 Broadway, Oakland 12, California

MINER AND MINER
Consulting Engineers
Incorporated

Greeley, Colo. **Littleton, Colo.**

JOHN J. MOZZOCHI AND ASSOCIATES
Highways — Airports — Developments
Survey — Design — Inspection

265 Hebron Avenue **Glastonbury, Conn.**

ELI M. LURIE, P. E.
Consulting Electrical Engineer

Hotel and Auditorium Sound. Industrial Communications, Public Address, Centralized Radio, Master Television Antennae Systems, Closed Circuit TV & Signal Systems. Complete Design, Planning and Specifications.

9349 Abbott Ave. **280 Broadway**
Surfside, Fla. **New York City**
JEfferson 8-3503 **REctor 2-0319**

BROCKWAY, WEBER & BROCKWAY, INC.

George S. Brockway Roy E. Weber
George R. Brockway

Staff

H. L. Fitzgerald T. A. Clark C. A. Anderson
R. E. Owen B. E. Whittington

Civil, Structural, Sanitary, Municipal, Electrical

West Palm Beach, Florida

SOUTH FLORIDA TEST SERVICE
Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4201 N.W. 7th Street **Miami 44, Florida**
Member A. C. I. L.

HAYNES AND EDWARDS
Consulting Engineers

Design and Supervision • Buildings
Bridges • Stadiums • Docks • Piers
Parking Garages • Prestress Plants
PRESTRESSED CONCRETE
Reinforced Concrete • Structural Steel

PO Box 1053 **MUtual 8-5631** **Lakeland, Fla.**

LAW ENGINEERING TESTING COMPANY

Foundation Investigations
Physical & Chemical Testing

Main Laboratories: Atlanta, Ga.
Charlotte, N. C., Albany, Ga., Tampa, Fla.

TILTON & TRUCHELET
Consulting Engineers

Corrosion—Heating & A. C. Sys.
Ind. Electronics—Fld. Strength
Close Ckt. T. V.—Telemetering
Ind. Waste—Filter Systems

98 Giralda Ave. **Coral Gables, Fla.**

ROBERT AND COMPANY ASSOCIATES
Consulting and Designing Engineers

Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.

Atlanta, Georgia

HOMER L. CHASTAIN & ASSOCIATES
Consulting Engineers

Civil, Structural, Mechanical, Industrial Design & Supervision, Construction, Engineering, Turnpikes, Bridges, Water Supply, Sewerage, Flood Control & Drainage, Material Controls, Municipal Engineering, Topographic Surveys.

155½ West Main Street **Decatur, Illinois**

CONSOER, TOWNSEND and ASSOCIATES

Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways. Paving, Power Plant, Appraisals, Reports, Traffic Studies, Airports, Gas & Electric Transmission Lines

360 East Grand Avenue, Chicago 11, Illinois
9½ N. Indiana St., Greencastle, Ind.

DE LEUW, CATHER & COMPANY
Consulting Engineers

Public Transit	Subways
Traffic & Parking	Railroad Facilities
Expressways	Industrial Plants
Grade Separations	Municipal Works
Urban Renewal	Port Development

150 North Wacker Drive, Chicago 6, Ill.
San Francisco Toronto Oklahoma City

SARGENT & LUNDY
Engineers

Steam and Electric Power Plants for Utilities and Industrials
Design • Supervision
Studies • Reports

140 South Dearborn Street
Chicago 3, Illinois
FRanklin 2-7130

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

SOIL TESTING SERVICES, INC.
Consulting Engineers

Soil Investigation—Laboratory Testing
Engineering Reports and Recommendations

1827 N. Harlem Avenue, Chicago 35, Illinois
Milwaukee; Portland, Michigan; San Francisco; Kenilworth, N. J.; Havana, Cuba

STANLEY ENGINEERING COMPANY
Consulting Engineers

Hershey Building **208 S. LaSalle St.**
Muscatine, Iowa **Chicago 4, Illinois**
1154 Hanna Building
Cleveland 15, Ohio

WIGHT AND COMPANY
Consulting Engineers

Bridges, Express Highways, Paving, Water Systems, Sewage and Waste Disposal, Flood Control and Drainage, Airports and Buildings, Site Planning, Reports.

1038 Curtiss St., Downers Grove, Ill.
301 E. Main St., Barrington, Ill.

CHAS. W. COLE & SON
Engineers—Architects

South Bend, Indiana

WILSON & COMPANY
Engineers

Water • Sewerage • Streets • Highways
Bridges • Electrical • Airfields • Drainage
Dams • Treatment Plants • Industrial Installations
Chemical Testing Lab • Aerial Mapping
Electronic Computer Services, Reproduction

631 East Crawford **Salina, Kansas**

OAKLE P. BULLOCK
Consulting Engineers
AIR DISTRIBUTION

Unusual Problems or Designs
Present or New Systems
New or Old Buildings

Consultations, Designs, Surveys, Reports
254 Laura **Wichita 7, Kansas**

BEDELL & NELSON ENGINEERS
Incorporated
Consulting Engineers-Architects
Design—Supervision—Reports

Airports	Highways & Bridges
Buildings	Industrial Plants
Bulk Terminals	Municipal Works
City Planning	Subdivisions
Docks & Wharves	Utilities

1200 St. Charles Ave. **New Orleans, La.**

PROFESSIONAL ENGINEERS

Put your card here

Keep your name before more than 50,000 readers. It's good business.

Alphabetized by States . . .
Louisiana-New York

PROFESSIONAL DIRECTORY

EUSTIS ENGINEERING COMPANY
FOUNDATION AND SOIL MECHANICS INVESTIGATIONS
Soil Borings — Laboratory Tests
Foundation Analyses — Reports
3635 Airline Highway
Metaire, Louisiana

WHITMAN, REQUARDT & ASSOCIATES
Engineers — Consultants
Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans Supervision, Appraisals
1304 St. Paul Street, Baltimore 2, Maryland

FAY, SPOFFORD & THORNDIKE, INC.
Engineers
Airports, Bridges, Express Highways
Water Supply, Sewerage, Drainage
Port and Terminal Works
Industrial Plants — Incinerators
Investigations, Reports, Designs
Supervision of Construction
Boston, Massachusetts

METCALF & EDDY
Engineers
Water, Sewage, Drainage, Refuse and Industrial Wastes Problems
Airports — Valuations
Laboratory
Statler Building — Boston 16, Mass.

COMMONWEALTH ASSOCIATES INC.
Consulting and Design Engineers
Power Generation
Electric—Gas—Water Systems
Industrial Planning
209 E. Washington Ave., Jackson, Michigan

THE HINCHMAN CORPORATION
Consulting Engineers
CORROSION CONTROL
Survey—Designs—Specifications
Evaluations
Francis Palms Building
Detroit 1, Michigan

PIERCE AND WOLF
Electrical Consulting Engineers
INVESTIGATIONS — REPORTS
PLANNING — DESIGN
SUPERVISION
Street Lighting, Airport Lighting
Hi-Voltage Transmission Lines,
Distribution Systems, Secondary
Networks, Industrial Controls.
2833 Cadillac Tower — Detroit 26, Mich.
WOodward 1-5700

BLACK & VEATCH
Consulting Engineers
Water—Sewage—Electricity—Industry
Reports, Design
Supervision of Construction
Investigations, Valuation and Rates
1500 Meadow Lake Parkway
Kansas City 14, Missouri

BURNS & McDONNELL
Engineers—Architects—Consultants
P.O. Box 7088 — Kansas City, Mo.
Telephone DElmar 3-4375

A. C. KIRKWOOD & ASSOCIATES
ENGINEERS
CONSULTANTS
7800 The Paseo
Kansas City 10, Mo.

RUSSELL & AXON
Consulting Engineers
Civil—Sanitary—Structural
Industrial—Electrical
Rate Investigations
408 Olive St., St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

SVERDRUP & PARCEL, INC.
Engineers—Architects
Bridges—Structures—Highways
Industrial and Power Plant
Engineering
915 Olive Street, St. Louis 1, Mo.
417 Montgomery St., San Francisco, Calif.

CONSULT
THIS
DIRECTORY
FOR
QUALIFIED
CONSULTANTS

EDW. J. ADAMEC, P. E.
Consulting Engineer
DESIGNS — ERECTION METHODS
Bridges and Structures
Foundations
Inspections and Reports
Fabricators Details
4-15 Banta Pl., P.O. Box 521, Fair Lawn, N. J.

FRANK E. HARLEY AND ASSOCIATES
Water Works, Sewage, Municipal
Highways
Harley Building
860 Godwin Avenue — Wyckoff, N. J.

Subsurface — Investigations
WARREN GEORGE
Henry D. Hammond, P. E.
Any Type Borings — Any Site
Preliminary Surveys — Reports
95 River St. — Hoboken, N. J.

AMMANN & WHITNEY
Consulting Engineers
Design and Supervision of Construction of Bridges, Highways, Expressways, Buildings, Special Structures, Airport Facilities.
111 Eighth Avenue, New York 11, N. Y.
724 E. Mason Street, Milwaukee 2, Wisc.

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

ANDREWS & CLARK
Consulting Engineers
305 East 63rd Street
New York 21, N. Y.

BURNS AND ROE, INC.
Engineering, Design, Plans and Specifications — Reports, Cost Estimates — Construction Supervision — Power Generating Plants: Steam, Nuclear, Hydro, Diesel — Aviation Test and Missile Support Facilities — Research and Development — Nuclear, Chemical, Industrial Plants.
160 West Broadway — New York 13, N. Y.

FOSTER & CAFARELLI
Engineers
Port Development, Shipyards, Drydocks, Power Plants, Distribution Systems, Industrial Plants, Commercial Buildings, Surveys, Reports, Estimates, Design, Supervision, Consultation
44 Whitehall Street, New York 4, N. Y.

HARDESTY & HANOVER
Consulting Engineers
Bridges—Long Spans of All Types
Movable—Lift, Bascule and Swing
Hanover Skew Bascule, Steel and Concrete Spans
Grade Crossing Eliminations
Expressways and Thruways
Other Structures, Foundations
Supervision, Reports, Appraisals
101 Park Avenue — New York 17, N. Y.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers
Bridges, Structures, Foundations
Express Highways
99 Church Street — New York 7, N. Y.
1805 Grand Avenue — Kansas City 8, Mo.

MADIGAN-HYLAND
Consulting Engineers
28-04 41st Avenue
Long Island City, New York

EMIL GRUENBERG & ASSOCIATES
Consulting Engineers
Industrial Plants, Utilities, Public & Commercial Buildings
Design — Surveys — Reports
Valuation — Consultation
All Types of Estimates for Private, Public & Armed Forces Installations
20 Vesey St. — New York 7, N. Y.

WALTER E. LOBO
Consulting Chemical Engineer
Petroleum & Chemical Process Industries
Process Development, Design and Evaluation
Economic Studies — Technical Reports
Process Design of Special Equipment
Furnaces — Towers — Reactors
124 East 40th St. — OXford 7-6188
New York 16, New York

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Missouri-Pennsylvania

THE C. W. NOFSINGER CO.
Engineers & Contractors
307 East 63rd St. EM 3-1460
Kansas City 13, Mo.

JAMES P. O'DONNELL
Engineers
Professional Engineering for the Petroleum and Process Industries
39 Broadway, New York 6, N. Y.

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers
Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.
165 Broadway, New York 6, N. Y.

PRAEGER-KAVANAGH
Engineers
126 East 38th St. New York 16, N. Y.

SEELYE STEVENSON VALUE & KNECHT
Consulting Engineers
Richard E. Dougherty, Consultant
Airports, Highways, Bridges, Dams, Water Supply, Sanitation, Tunnels, Industrial Plants, Concrete, Steel, Industrial Waste Disposal, Foundations, Soil Studies.
CIVIL—MECHANICAL—ELECTRICAL
101 Park Avenue New York 17, N. Y.

SINGSTAD & BAILLIE
Consulting Engineers
Ole Singstad David G. Baillie, Jr.
Tunnels, Subways, Highways, Foundations, Parking Garages, Investigations, Reports, Design Specifications, Supervision
24 State St. New York 4, N. Y.

D. B. STEINMAN
Consulting Engineer
HIGHWAYS — BRIDGES — STRUCTURES
Design — Construction — Investigation Strengthening — Reports — Advisory Service
117 Liberty Street New York 6, N. Y.

SYSKA & HENNESSY, INC.
Engineers
Heating Ventilating Air Conditioning
Electric & Sanitation
Design Reports Consultation
NEW YORK, N. Y.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

TIPPETTS-ABBETT McCARTHY-STRATTON
Engineers
Ports, Harbors, Flood Control, Irrigation Power, Dams, Bridges, Tunnels, Highways, Subways, Airports, Traffic Foundations, Water Supply, Sewerage, Reports, Design Supervision, Consultation
62 West 47th Street New York City

WATER SERVICE LABORATORIES, INC.
Chemical Engineers
Specialists in Water Treatment
Consulting and Technical Services
Main Office: 615 W 131 St., N. Y. 27, N. Y.
Offices also in: Phila., Wash., & Richmond

ADACHE ASSOCIATES, INC.
ENGINEERS
Penthouse, Hotel Hollenden
Cleveland 14, Ohio

HARRY BALKE ENGINEERS
Consulting Engineers
Consulting Service—Reports, Design, Supervision, Research
Bridges, Buildings, Structures, Toll Roads, Expressways, Highways
2330 Victory Parkway
Cincinnati 6, Ohio

CONSULT
THIS
DIRECTORY
FOR
QUALIFIED
CONSULTANTS

E. D. BARSTOW & ASSOCIATES
E. D. Barstow—T. A. Gilliam
Water Supply, Sewerage, Highways, Structures, Industrial
163 N. Union Street Akron 4, Ohio

ELMER S. BARRETT ASSOCIATES
Consulting Engineers
Surveys—Design—Inspection
Highways Municipal
Railroads Reports
Bridges
249 S. Paint St. Chillicothe, Ohio
Phone PRospect 3-2287

GUSTAVE M. GOLDSMITH
Consulting Engineer
General Structures Plant Layout
Design—Investigation—Quantity Surveys
1734 Bella Vista Cincinnati 37, Ohio

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

JONES, HENRY & WILLIAMS
Consulting Sanitary Engineers
Water Works
Sewerage and Treatment
Waste Disposal
Security Bldg. Toledo 4, Ohio

ELMER A. KISH ENGINEERS
Engineers—Consultants
Municipal and Industrial
Consulting, Design, Investigations
Reports
4837 Fairlawn Road Lyndhurst 24, Ohio

H. R. RICHARDS—A. V. ALEXEFF & ASSOCIATES
Consulting — Design
Development — Fabrication
Continuous Processing Machinery
INDUSTRIAL OVENS, INC.
13825 Triskett Rd., Cleveland 11, Ohio
Tel. CL 1-4400

JOHN OSTBORG
Engineer Designer
Diesel Engine Design Consultant
Mechanical Engineering & Design Service
31 E. High Street Springfield, Ohio

TOLEDO TESTING LABORATORY
Engineers and Chemists
Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and Investigation of
Engineering Works and Materials
1810 North 12th St. Toledo 2, Ohio

VOGT, IVERS, SEAMAN & ASSOCIATES
Design and supervision of Municipal and Industrial Facilities: Bridges, Highways, Expressways; Buildings, Special Structures, Airports; Diesel, Hydro-Electric, Steam, Power Facilities; City Planning and Reports.
34 West Sixth Street, Cincinnati 2, Ohio
20 North Wacker Drive, Chicago 6, Ill.

OKLAHOMA TESTING LABORATORIES
Registered Engineers—Chemists
Oklahoma City, Okla.
Materials Testing and Inspection
Member A. C. I. L.
C. A. Lashbrook, Owner-Director
M. A. Witte, Chief Engineer

ALBRIGHT & FRIEL, INC.
CONSULTING ENGINEERS
Water, Sewage, Industrial Wastes and Incineration Problems, City Planning, Highways, Bridges and Airports, Dams, Flood Control, Industrial Buildings, Investigations, Reports, Appraisals and Rates.
Three Penn Center Plaza
Philadelphia 2, Pa.

PROFESSIONAL DIRECTORY

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance .....$ 96.00
12 mos., billed monthly @ $9.00 ea. 108.00
6 mos., paid in advance 54.00
6 mos., billed monthly @ $10.00 ea. 60.00

MICHAEL BAKER, JR., INC.
Consulting Engineers
Highways, Airports, Waterworks, Sewers, Sewage Treatment, City Planning, Surveys, Photogrammetric Mapping.
Baker Building—Rochester, Penna.
Branch Offices
Harrisburg, Pa., Jackson, Miss., College Park, Md., Charleston, W. Va. Columbus, Ohio, Huntingdon, Pa.

BUCHART ENGINEERING CORP.
Consulting Engineers
Highways — Bridges — Sewer Systems — Surveys
Water Works — Dams — Reports — Supervision
Industrial — Municipal — Structures
55 S. Richland Ave., York, Pa.
Lancaster, Pa. Washington, D. C.

AUBURN & ASSOCIATES, INC.
Engineers for Heavy Industry
Electrical, Civil, Mechanical and Piping Professional Staff
A. J. Mosso, P.E. B. J. Auburn, P.E.
H. G. Smith, P.E. C. W. Oettinger, P.E.
W. B. Kennedy, P.E. M. P. Wodzianski, P.E.
J. F. Schaffer, P.E. J. W. Gilder, P.E.
923 Penn Avenue Pittsburgh 22, Pa.

CAPITOL ENGINEERING CORPORATION
Engineers—Constructors—Management
Design and Surveys Roads and Streets
Sewer Systems Water Works
Planning Airports
Bridges Turnpikes Dams
Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. Pittsburgh, Pa.
Dallas, Texas Paris, France

FRAZIER-SIMPLEX, INC.
CONTRACTING & CONSULTING ENGINEERS
Furnace Engineering for the Glass and Steel Industries
486 East Beau Street, WASHINGTON, PA. U. S. A.

GILBERT ASSOCIATES, INC.
Consulting Engineers and Designers
Public Utility & Industrial Plant Engineers
Water Works and Sanitary Engineering
Direction of Construction
Safety Engineering
Business and Economic Research
Property Valuation
Public Utility Rate Regulation
New York Reading, Pa. Washington

GANNETT, FLEMING, CORDDRY & CARPENTER, INC.
Engineers
Water, Sewage, Roads, Turnpikes
Bridges, Airports, Traffic, Appraisals
HARRISBURG, PA.
Philadelphia, Pa. Daytona Beach, Fla.
Pittsburgh, Pa. Medellin, Colombia, S. A.

GREEN ENGINEERING COMPANY
Consulting Engineers
Highways, Bridges, Buildings
Water and Sewage
Industrial Plants
Sewickley, (Pittsburgh) Pa.
Boston, Mass. Baltimore, Md.

ELECTRICAL CONTRACTORS ASSOCIATES, INC.
Contracting Electrical Engineers
Altoona, Penna.

HALL LABORATORIES
DIV. OF HAGAN CHEMICALS & CONTROLS, INC.
Consultants on Industrial Water Problems
Boiler Water Conditioning, Cooling Water Treatment, Process and Waste Water Engineering Service
Dust Collection Particle Size Analysis
Hagan Building Pittsburgh 30, Pa.

HARRIS, HENRY & POTTER, INC.
Consulting — Design — Reports
Mechanical — Electrical — Civil
Architectural
Spring Valley R.D. 3, Doylestown, Pa.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance .....$ 96.00
12 mos., billed monthly @ $9.00 ea.. 108.00
6 mos., paid in advance 54.00
6 mos., billed monthly @ $10.00 ea. 60.00

THE KULJIAN CORPORATION
Engineers • Constructors • Consultants
POWER PLANTS
(Steam, Hydro, Diesel)
Oil Refineries, Pipe Lines • Chemical Plants • Textile Plants • Breweries, Food Processing Plants • Airports • Hangars
Army, Navy Installations
1200 No. Broad St., Philadelphia 21, Pa.

D. C. LATELLA & ASSOCIATES, INC.
INDUSTRIAL ENGINEERS
Management Consultants
Widener Bldg. Philadelphia, Pa.

LAWRIE & GREEN & ASSOCIATES
Architectural and Engineering Offices
321 N. Front Street
Harrisburg, Pennsylvania
Ritchie Lawrie, Jr., P.E., Consulting Engineer

MODJESKI AND MASTERS
Consulting Engineers
G. H. Randall J. R. Giese
F. M. Masters H. J. Engel
Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations
900 N. Sixth St. New Orleans, La.
Harrisburg, Pa. Philadelphia, Pa.

V. C. PATTERSON & ASSOCIATES, INC.
Engineers
Refrigeration Specialists
Warehouses—Refrigeration & Installation
Food Freezing—Low Temp. Refrigeration
Patented System for Correction of Frost-heaved Floors
415 W. Market Street York, Penna.

PITTSBURGH TESTING LABORATORY
Testing—Inspection—Analysis
Radiography—Soils Mechanics
Main Office, Pittsburgh, Pa.
32 Laboratories in Principal Cities

CYRUS WM. RICE & CO., INC.
Consulting Chemical Engineers
Industrial Water and Waste
16 Noble Avenue, Pittsburgh 5, Penna.

EMERSON VENABLE
Chemist and Chemical Engineer
Chemical Analysis
Research — Development
Trouble Shooting
6111 Fifth Ave., Pittsburgh 32, Pa.

ENGINEERS TESTING LABORATORY, INC.
Soil Mechanics and Foundation Engineering
Soil Borings Laboratory Tests
Foundation Analyses Reports
2116 Canada Dry St., Houston 23, Texas
444 North 9th Street, Baton Rouge, La.

FORREST and COTTON, INC.
Consulting Engineers
Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports
600 Vaughn Building Dallas 1, Texas

FREESE & NICHOLS
407 Danciger Bldg.
Fort Worth, Texas
FREESE, NICHOLS & TURNER
2111 C & I Bldg.
Houston, Texas
Consulting Engineers

LOCKWOOD, ANDREWS & NEWNAM
Consulting Engineers
Water Works, Sewerage & Sewage Disposal, Public Works, Structures, Earthworks, Mechanical & Electrical.
Reports—Design—Supervision
Surveys—Valuations
Corpus Christi—Houston—Victoria, Texas

FERGUSON-GATES ENGINEERING CO.
Registered Professional
Civil and Mining Engineers
Coal Property Reports — Valuation — Development — Plant Design — Ventilation
Allen Building P. O. Box 672
CLifford 2-5338 Beckley, W. Va.

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

Supplemental Services

BUILDERS ESTIMATING SERVICE, INC.
Specialists in preparation of Budget, Control, preliminary & final estimates. Army, Navy & Air Force installations
120 Greenwich Street
New York 6, N. Y.
Telephone Number
Rector 2-4187

GILES DRILLING CORPORATION
Subsurface Explorations
Large Calyx Holes in Rock
Engineering Geology Reports
2 Park Avenue — New York 17, N. Y.

PHILIP J. HEALEY, INC.
Engineers and Contractors
TEST BORINGS
CORE DRILLING for FOUNDATIONS
207 Baldwin Ave., Jersey City 6
Jo. Sq. 2-3313
11 Park Place, New York 7
Ba. 7-2728

CONSULT THIS DIRECTORY FOR YOUR NEEDS

PHOTRONIX, INC.
Aerial Photogrammetry and Electronic Computation
For Engineers, By Engineers
790 King Avenue — Everett S. Preston
Columbus 12, Ohio — Chief Engineer

SPRAGUE & HENWOOD, INC.
Drilling Services
Foundation Investigations, Test Boring
Grout Hole Drilling and Pressure Grouting
Diamond Core Drilling
221 W. Olive St., Scranton, Pa.
New York, Phila., Pittsburgh, Atlanta
Grand Junction, Colorado
Buchans, Newfoundland

PENNSYLVANIA DRILLING COMPANY
Subsurface Explorations • Grouting
Industrial Water Supply • Mineral Prospecting
Large Diameter Drilled Shafts
1205 Chartiers Ave. — Pittsburgh 20, Pa.

AERIAL MAP SERVICE CO.
Topographic, Planimetric, Photo Maps for Highways, Mining, Resources, Construction. City Maps, Tax Maps, Photo Geology. Tellurometer Radio Distance Measurements, Triangulation, Electronic Computation.
1016 Madison Ave. — Pittsburgh 12, Pa.

Frankly . . .

We're Experimenting!

This month we present a new method to bring you information on advertisers' products and services—a handy, self-addressed envelope. *Actually it is designed to cut printing and handling costs for your magazine, so use it!* Just circle the numbers on the reverse side of this sheet *(turn page for instructions)*, affix a 4¢ stamp below, fold, fasten and mail. It's easy and it will allow us to expand our advertising promotional efforts in still other directions!

Have You Heard About AE's NEW Expanded Readers' Service Department?

Read All About It on the Reverse Side of this Page NOW!

► CLIP COUPON—**Fold Along This Line**—**Fasten (Staple, Tape, Glue)**—MAIL ◄

4¢ STAMP

TO:

AMERICAN ENGINEER

2029 K STREET, N. W.

WASHINGTON 6, D. C.

FASTEN HERE ONLY ◗ ◖ FASTEN HERE ONLY

Advertisers' Index

Adache Associates, Inc. 47
Edw. J. Adamec 46
Aerial Map Service Co. 49
Albright & Friel, Inc. 47
Ammann & Whitney 46
Andrews and Clark 46
Auburn and Associates, Inc. 48
Michael Baker, Jr., Inc. 48
Harry Balke Engineers 47
Elmer S. Barrett Associates 47
E. D. Barstow & Associates 47
Bedell and Nelson 45
Black & Veatch 46
Bordon Metal Products Co. 18
Brockway, Weber & Brockway, Inc. 45
Buchart Engineering Corp. 48
Builders Estimating Service, Inc. .. 49
Oakle P. Bullock 45
Burns & McDonnell 46
Burns & Roe, Inc. 46
Capitol Engineering Corporation .. 48
Homer L. Chastain & Associates .. 45
Chas. W. Cole & Son 45
Commonwealth Associates, Inc. .. 46
Consoer, Townsend and Associates 45
De Leuw Cather & Company 45
Electrical Contractors, Assoc., Inc. 48
Engineers Testing Laboratory, Inc. 48
Eustis Engineering Company 46
Fay, Spofford & Thorndike 46
Ferguson-Gates Engineering Co. .. 48
Forrest and Cotton, Inc. 48
Foster & Cafarelli 46
Franklin Engineering 45
Frazier-Simplex, Inc. 48
Freese & Nichols 48
Gannett, Fleming Corddry & Carpenter, Inc. 48
Gilbert Associates 48
Giles Drilling Corporation 49
Gustave M. Goldsmith 47
Green Engineering Co. 48
Greenwich Book Publishers 13
Emil Gruenberg & Assoc. 46
Hall Laboratories 48
Alexander Hamilton Institute 9
Hardesty & Hanover 46
Frank E. Harley & Associates 46
Harris, Henry & Potter, Inc. 48
Haynes and Edwards 45
Philip J. Healey, Inc. 49
The Hinchman Corporation 46
Howard Needles, Tammen & Bergendoff 46
Industrial Ovens, Inc. 47
International Engineering Co., Inc. 45
Jones, Henry & Williams 47
Kaiser Engineers 45
A. C. Kirkwood & Associates 46
Elmer A. Kish 47
Kuljian Corporation 48
D. C. Latella & Associates 48
Law Engineering Testing Co. 45
Lawrie & Green & Associates 48
Walter E. Lobo 46
Lockwood, Andrews & Newnam ... 48
Eli M. Lurie 45
Madigan-Hyland 46
Metcalf & Eddy 46
Miner and Miner 45
Modjeski and Masters 48
John J. Mozzochi & Assoc. 45
Niagara Blower Co. 12
The C. W. Nofsinger Co. 47
James P. O'Donnell 47
Oklahoma Testing Laboratories ... 47
John Ostborg 47
Palmer & Baker Engineers, Inc. 45
Parsons, Brinckerhoff, Hall & MacDonald 47
V. C. Patterson & Associates 48
Pennsylvania Drilling Co. 49
Photronix, Inc. 49
Pierce and Wolf 46
Pittsburgh Testing Laboratory 48
Portland Cement Assoc. 4
Praeger-Kavanagh 47
Revolvator Co. 15
Cyrus Wm. Rice & Co., Inc. 48
Robert and Company Associates .. 45
Ross-Martin Co. 6
Russell and Axon 46
Sargent & Lundy 45
Seelye Stevenson Value & Knecht .. 47
Singstad & Baillie 47
Soil Testing Services, Inc. 45
South Florida Test Service 45
Sprague & Henwood, Inc. 49
Stanley Engineering Company 45
D. B. Steinman 47
Sverdrup & Parcel, Inc. 46
Syska & Hennessy, Inc. 47
Tilton and Truchelet 45
Tippetts-Abbett-McCarthy-Stratton . 47
Toledo Testing Laboratory 47
Union Asbestos & Rubber Co. ..... back cover
Vapor Heating Corp. 2
Emerson Venable 48
Vogt, Ivers, Seaman & Associates .. 47
Warren George 46
Water Service Laboratories, Inc. .. 47
Whitman, Requardt and Associates . 46
Wight & Co. 45
Wilson & Company 45

Announcing...

AE's EXPANDED Readers' Service Department!

Now it is easier than ever for you to get information f-a-s-t on new products and services. The other side of this page when folded makes a *self-addressed reply envelope* that is all ready to come back to us. All you have to do to use it is to first read the advertisements, and the "Progress in Products" and "New Literature" features in every issue, noting that each makes specific reference to numbers on the form below.

Then if you want more information about any item, simply circle the corresponding number on the form, sign, fold, fasten and MAIL TODAY!

AE We do the rest. And within days, the data and literature you want is on its way to you.

AE Take advantage of this FREE service. Use this handy envelope NOW!

(*P.S. Don't forget the stamp.*)

AMERICAN ENGINEER
2029 K Street, N.W.
Washington 6, D. C.

Please have information sent to me on items circled below:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40 Back Cover

Additional Remarks: .....

.....

My Name ..... **Title** .....

Company Name .....

Address .....

City ..... **Zone** ..... **State** .....

Progress in Products

PIPE INSULATION — Item 30

Owens-Corning Fiberglas Corporation is announcing One-Piece Pipe Insulation, a multi-purpose product, for installation on hot and cold lines with temperatures of from 400 degrees Fahrenheit to thirty degrees below zero, F. Because it is manufactured in one piece, the new product can be applied quickly and easily with resulting labor savings up to fifty per cent, it is claimed.

WELDING AGENT — Item 31

One of the biggest and oldest problems of the construction industry—joining fresh wet concrete—has been overcome with the development of "Uniweld," a new structural welding agent, according to an announcement by Permagile Corp. of America. Uniweld is an "alloy" of epoxy and nylon type synthetic resins which forms a permanent joint and water vapor barrier—literally welding the entire contact area without any mechanical interlocking. Tension, compression, shear and impact tests show that the bond is many times stronger and tougher than even fully hardened concrete.

TRACTOR SHOVEL — Item 32

The Trojan Division of The Yale & Towne Manufacturing Co. announces the Trojan 124, a new 4-wheel drive tractor shovel with three interchangeable buckets: a 1½-yard general utility bucket, a 1¼-yard heavy material bucket, a 2-yard light material bucket. The 10,000-pound lifting capacity of the Model 124 permits it to function at maximum efficiency with any of the three buckets in operation.

SOLAR ENERGY KIT — Item 33

A device demonstrating the direct conversion of light into electricity, through silicon junction solar energy converters, has been developed by Hoffman Electronics Corporation for experimental use in school and industrial laboratories. It will be made available to qualified persons at cost, on request, along with materials outlining the history of solar energy conversion, details of solar converter construction, physical properties and performance specifications.

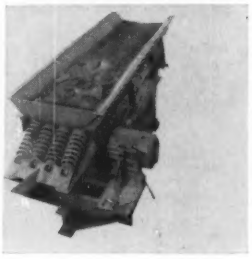
SELF-STICKING LABEL — Item 34

Labelon Tape Co. announces a new self-sticking label especially designed for outdoor or permanent indoor use. The new product consists of a pressure-sensitive card that can be written or typed upon, and then covered with an attached clear layer of outdoor type Mylar plastic for permanent protection. The protection will withstand the rigors of rain, dirt and sunlight, and is not affected by grease, oil or acids, it is claimed.

SENSITIZED FILM — Item 35

Eugene Dietzgen Co. announces development of a Diazo sensitized film for producing duplicate originals. According to the manufacturer, the Mylar base of this new material provides never-before-achieved ease of eradication, extraordinary toughness and dimensional stability. The film is sensitized on its glossy reverse side. Thus, repeated eradication on this glossy surface cannot affect the front matté surface for making engineering changes.

INCLINED CONVEYOR — Item 36



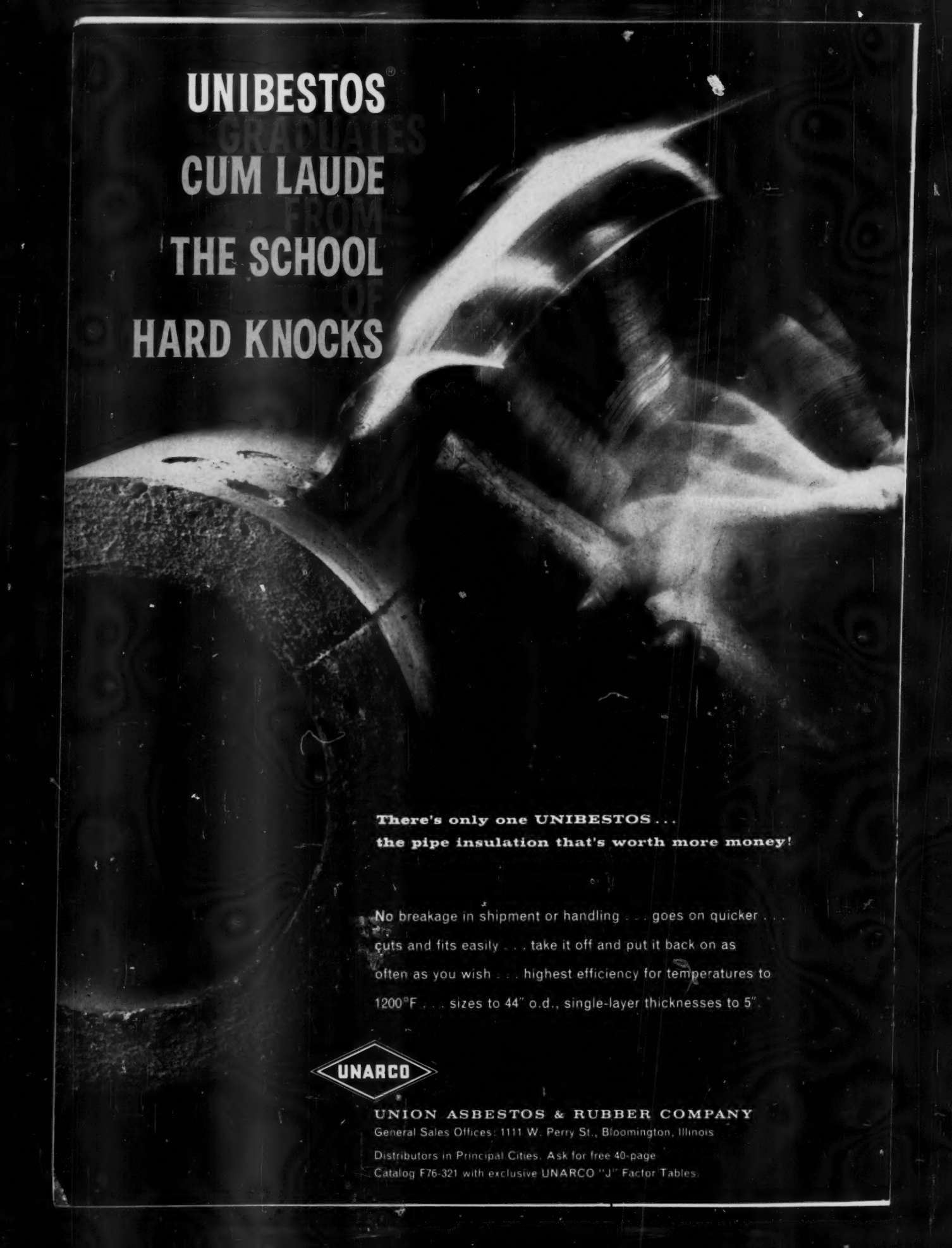
Carrier Conveyor Corp. has developed a mechanical vibrating conveyor for moving solid granular materials, castings, sand and tramp iron uphill at inclines of five to twenty-five degrees. The inclined conveyor is being introduced to take over jobs that the more complex and expensive drag and apron conveyors are now performing. The most outstanding feature of this unit is its patented "step-trough" design.

DESIGN AIDE — Item 37

PIC Design Corp. offers a complete package of over fourteen design tracing templates which were created to assist designers, engineers, and all those associated with the development of specific mechanical systems. These templates stress the "economy" of precious engineering and detailed drafting time. They can be used for breadboard layouts, prototypes, design production, technical sketching and detail part drawings. They are expected to save engineering and designing hours and cover numerous basic mechanical components.

This column describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.



There's only one UNIBESTOS . . .
the pipe insulation that's worth more money!

No breakage in shipment or handling . . . goes on quicker . . . cuts and fits easily . . . take it off and put it back on as often as you wish . . . highest efficiency for temperatures to 1200°F . . . sizes to 44" o.d., single-layer thicknesses to 5".

UNARCO

UNION ASBESTOS & RUBBER COMPANY
General Sales Offices: 1111 W. Perry St., Bloomington, Illinois

Distributors in Principal Cities. Ask for free 40-page Catalog F76-321 with exclusive UNARCO "J" Factor Tables.